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Publication Office	Editorial and Executive Offices
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Member, Audit Bureau of Circulations
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Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

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THE IRON AGE

Contents

SEPTEMBER 14, 1939

More, More, More!	11
A Hundred Slaves for Each American	51
Flame Gouging for Grooving Steel	53
Heavy Duty Boring Lathes for Export	58
Steel Standardization	61
Improving Flexibility of Welding Fixtures	67
A New Principle in Tool and Die Milling	68
Machine Tool Developments Proceed Apace	71
On the Assembly Line	78
Washington News	82
THE NEWS IN BRIEF	98
Statistics on Metal-Working Activity	102
Weekly Ingot Operating Rates	103
Rate of Activity in Capital Goods	103
Plant Expansion and Equipment Buying	120

▼ ▼ ▼

Just Between Us Two	131
Products Advertised	132
Index to Advertisers	156

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Play Safe!

Use Ryerson Certified Steels

Reduce failures . . . eliminate spoilage . . . and get better results at lower cost by using Ryerson Certified Steels—steels that represent the highest quality obtainable in each different classification.

In Ryerson Certified Steels you are assured the utmost uniformity—freedom from hard spots—desirable bending and fabricating characteristics that reduce shop labor costs and help produce sound dependable jobs in less time.

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Ryerson Certified Steels also include carbon, tool and stainless steels that meet definite high standards of uniformity and quality. They offer a safe, sure way of getting maximum value from your steel dollar.

Let us send you the Ryerson Stock List showing the full range of Certified Steels—in all shapes and sizes—carried in stock for immediate shipment. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

▲▲▲ THE IRON AGE ▲▲▲

SEPTEMBER 14, 1939

ESTABLISHED 1855 Vol. 144, No. 11

A Hundred Slaves for Each American

ALADDIN, of the Arabian Nights, possessed through his magical lamp the power to summon a slave to carry out his commands. The average American of today, however, according to Dr. Robert A. Millikan, commands a hundred slaves in the form of power machines.

Says this eminent physicist:

"In this country there is now expended about 13.5 hp-hr. per day per capita—the equivalent of 100 human slaves for each of us; in England the figure is 6.7, in Germany 6.0, in France 4.5, in Japan 1.8, in Russia 0.9, in China 0.5. In the last analysis this use of power is why our most important social changes come about.

"This is why we no longer drive our ships with human slaves chained to the oars as did the Romans and the Greeks.

"This is why we no longer enslave whole peoples, as did the Pharaohs, for building our public structures and lash them to their tasks.

"This is why 10 times as many boys and girls are in the high school today in the United States as were there in 1890—more than five million now, half a million then.

"This is why we have now an 8-hr. day instead of, as then, a 10, a 12 or sometimes a 14-hr. day.

"This is why we have on the average an automobile for every family in the country.

"This is why the lowest class of male labor, i.e., unskilled labor, gets nearly twice as much in real wages in the United States as in England, three times as much as in Germany or France, and 13 times as much as in Russia."

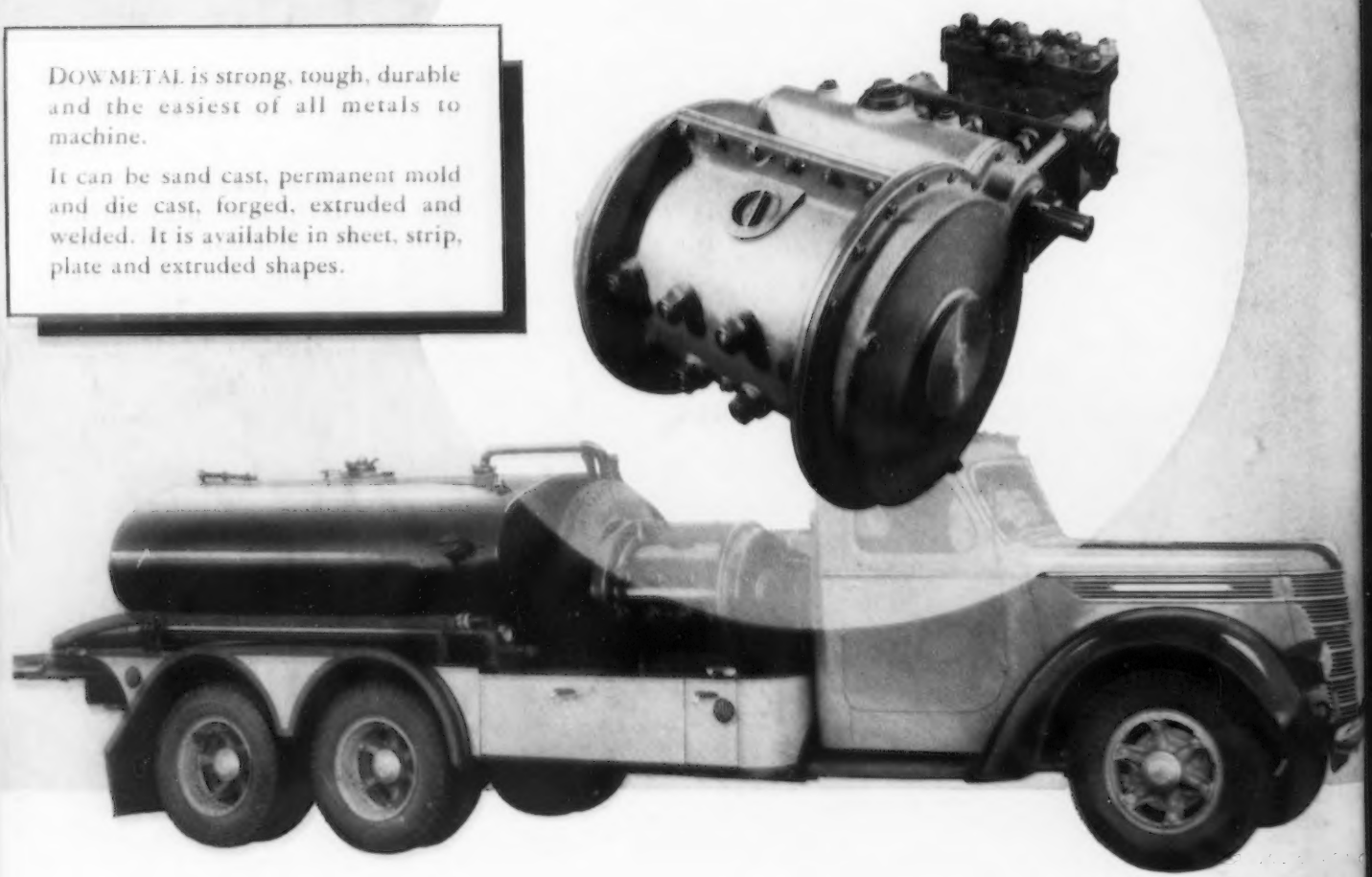
Dr. Millikan has no "axe to grind" for the American System of Enterprise. He is not interested in the profit motive. His view of mechanization is a detached one. That it coincides with ours is gratifying to us and significant as an unbiased and effective endorsement of invention, improvement and mechanical progress.

Dowmetal's *Lightness*

STREAMLINES THE WEIGHT OF PRODUCTS

DOWMETAL is strong, tough, durable and the easiest of all metals to machine.

It can be sand cast, permanent mold and die cast, forged, extruded and welded. It is available in sheet, strip, plate and extruded shapes.



EVERY CHAMPION has to train down needless weight. That is just as true of products as of people.

Take the case of this big high pressure triplex pump. It's carried as equipment by the trucks of a special tank fleet that transport chemicals for treating oil wells. To maintain truck capacity for payload it was essential that the pump be light. So the Union Steam Pump Company chose DOWMETAL* for all the pump castings. The result: it lightened the pump by 2200 pounds!

In more than three years of bruising service in the oil fields, no failure has ever been chalked up against these pumps. That's the kind of record-breaking strength and toughness that goes hand in hand with DOWMETAL'S extreme lightness.

A full third lighter than any other structural metal, DOWMETAL leads the list of all metals in its ability to streamline the weight of products. See how DOWMETAL'S lightness can give your product greater efficiency and sales appeal. Send for the illustrated DOWMETAL booklet, "Industry's Lightest Structural Metal," today.

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1720 EAST MAIN STREET
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DOWMETAL
MAGNESIUM ALLOYS
INDUSTRY'S LIGHTEST STRUCTURAL METAL

*Trade Mark Reg. U. S. Pat. Off.

Be sure to visit the Dowmetal Booth at the National Metal Congress and Exposition in Chicago, October 23 to 27.

Visit exhibits of The Dow Chemical Company and its Great Western Electro-Chemical Company Division at the Golden Gate International Exposition

A. J. C. SEP 16 193
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SEPTEMBER 14, 1939

THE IRON AGE

44"

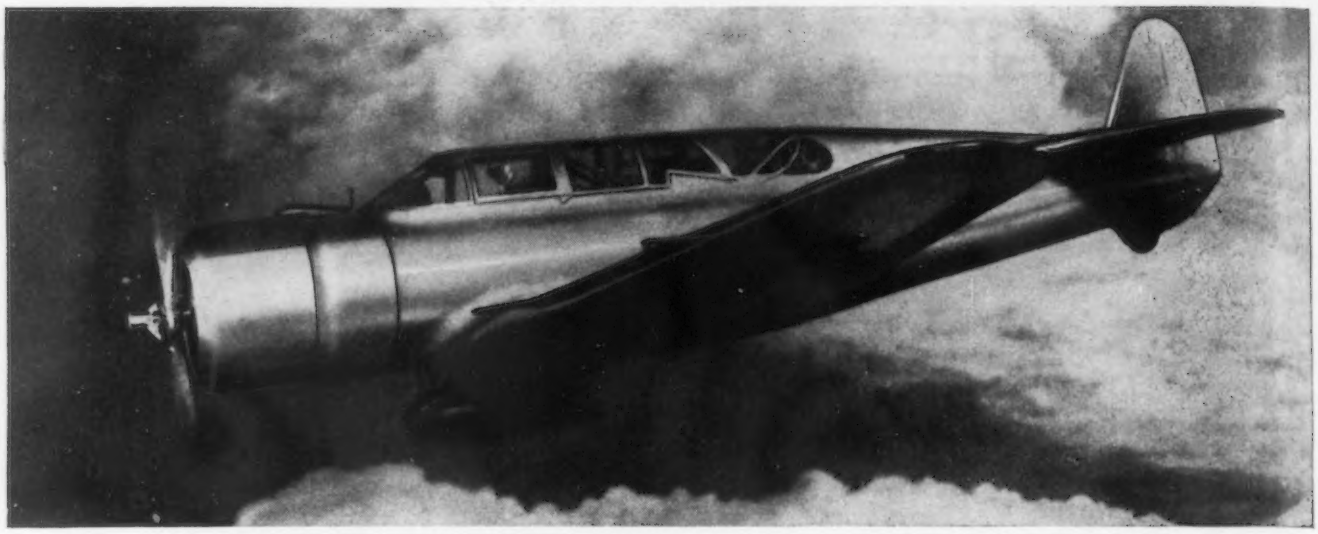
Inland's two continuous strip and sheet mills—the 44" and 76"—are the last word in accuracy and quality control.

INLAND STEEL

great mills are teamed
her, with ample capacity
rve your needs—from
w strip to wide sheets.
rn cold finishing, galvan-
and tinning equipment
ete the service facilities.

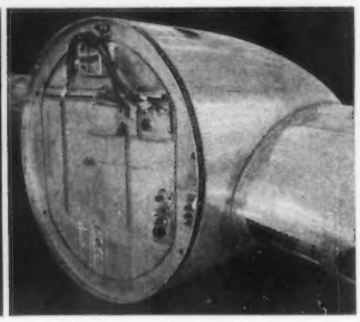
76"

How STAINLESS STEEL helps make Aircraft Lighter, Stronger, Safer



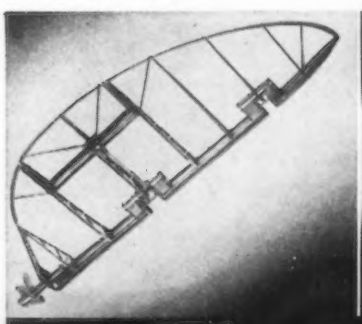
This Vultee V-12 attack bomber uses stainless steel for exhaust manifolds and fire walls to resist heat and corrosion and for military applications where lightness, corrosion-resistance, and abrasion-resistance are essential.

Above: Latest Piper "Cubs" use lightweight, corrosion-resistant stainless steel gasoline tanks.

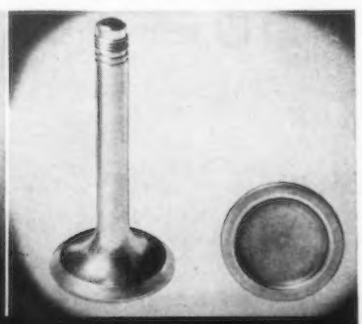


Above: This 18-8 stainless steel fire wall for use on the Douglas DC-4 is fireproof and immune to corrosion.

Below: A light, strong elevator frame for a Seversky P-35 fabricated from stainless steel by high-speed spot-welding.



Below: Stainless steel sodium-cooled exhaust valves, faced with Haynes Stellite alloy, after operating 714,000 air miles.



Electromet
Trade-Mark
Ferro-Alloys & Metals

DESIGNERS and manufacturers of all types of aircraft find stainless steel an ideal material for an increasing number of uses. A few typical applications are shown here. Stainless steel has four inherent advantages which make it a logical material for use in aircraft construction:

1. **Excellent Strength-Weight Ratio** – Compares favorably with other commonly used materials. *Result:* Strength with light weight . . . more pay load . . . longer cruising range.
2. **Ease of Fabrication** – by modern, high-speed welding processes. *Result:* Faster production . . . cheaper production. Smoother surfaces . . . less drag . . . higher speeds.
3. **Corrosion Resistance** – immune to atmospheric corrosion. *Result:* No painting . . . faster production . . . less maintenance.
4. **Strength at High Temperatures** – up to 1650 deg. F. *Result:* Resists hot, corrosive gases and abrasion . . . longer life . . . dependability. Fireproof . . . greater safety.

We do not make steel, but for over thirty years we have produced "Electromet" ferro-alloys used in making steel. The fund of data on stainless and other alloy steels thus accumulated and the assistance of our metallurgists are available without obligation. A request on your letterhead will bring the book, "Stainless Steel in Aircraft."

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.
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THE NEWS IN BRIEF	98
Statistics on Metal-Working Activity	102
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Rate of Activity in Capital Goods	103
Plant Expansion and Equipment Buying	120

▼ ▼ ▼

Just Between Us Two	131
Products Advertised	132
Index to Advertisers	156

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CASTINGS FOR HOT JOBS

We make good alloy castings that stand up well at high temperatures. They also weld readily and machine right easily. They vigorously resist oxidation, abrasion and sulfurous atmospheres. Used for furnace parts, retorts, boxes and pots, for example. Light cross-sections and economical heat-hour-cost. . . . Hoskins Manufacturing Co., Detroit, Michigan.

Hoskins electric furnaces are made in a large range of sizes, to fit widely varied needs.

Our casting metal is melted in high frequency induction furnaces, which assure clean castings and extremely close control of composition. Let us quote or give you some design suggestions.

We often save the customer money by showing how castings may be made lighter, with no sacrifice in performance.

(Right) Chromel alloys can be had in hot and cold rolled form, for mechanical uses, demanding heat-resisting properties.

Chromel HEATING ELEMENT WIRE

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Bethlehem Steel Sheets

. . . for the Housewives of Tomorrow

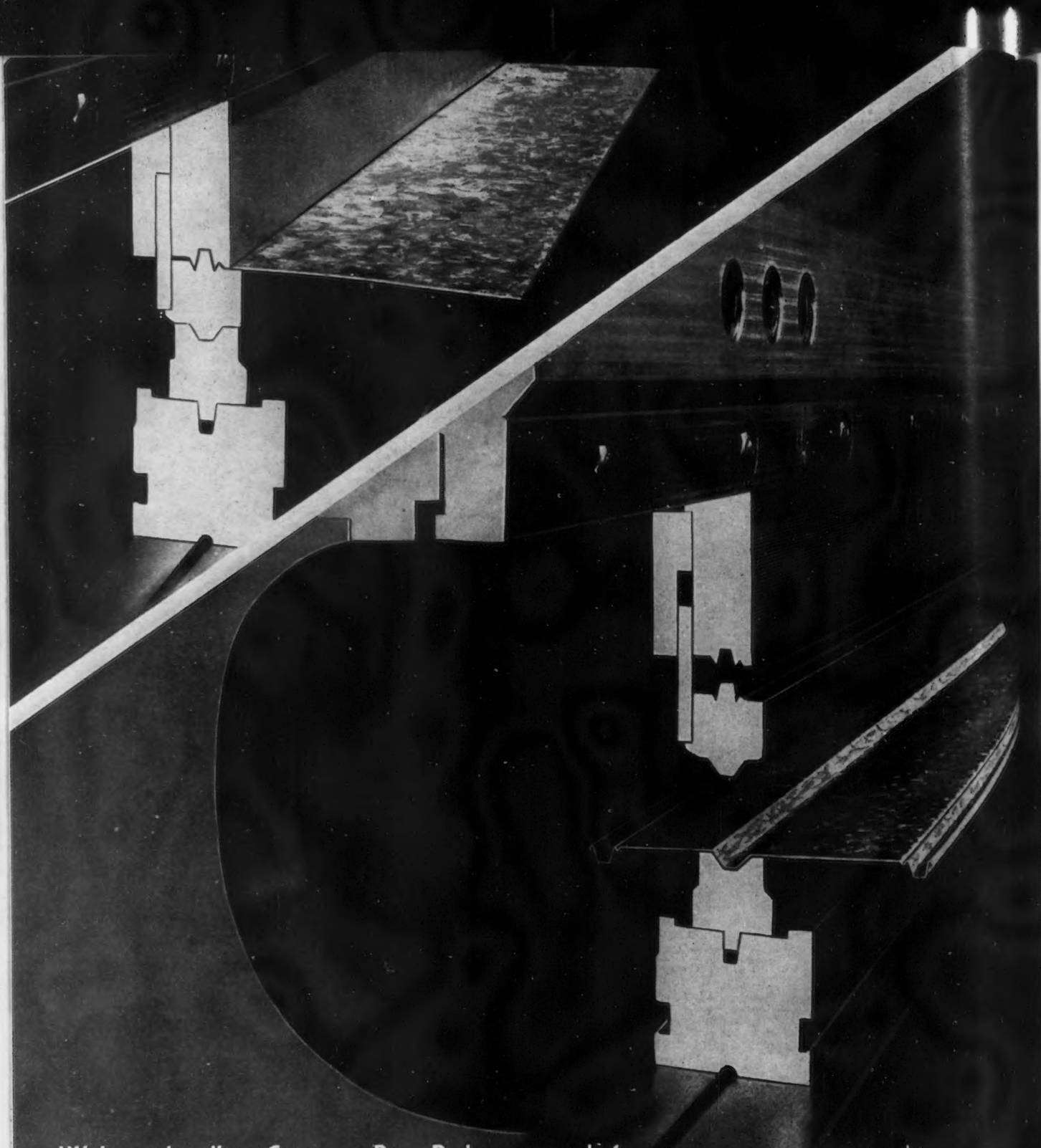
Housewives-to-be, like this class in a model school kitchen, are being trained in using gleaming steel equipment. Refrigerator, stove, cabinets and sink stand—styled in Bethlehem Steel Sheets for convenience plus good looks.

Manufacturers of this modern household equipment find Bethlehem Steel Sheets doubly satisfactory. In the plant, output is increased, scrap loss reduced, because Bethlehem sheets are consistently workable, adapted to deep draws and high-speed welding and finishing operations. On the showroom floor, too, the superior surface qualities and flatness of Bethlehem Steel Sheets are tangible advantages in catching the shopper's eye and making the cash register ring more often.

Let a Bethlehem representative tell you about the many grades and analyses available in Bethlehem Steel Sheets. It may help in selling more housewives today and tomorrow.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL



With one handling, Cincinnati Press Brakes accurately form galvanized roofing with this "double-decker" die without damage to the coating.

Write for details about your production.

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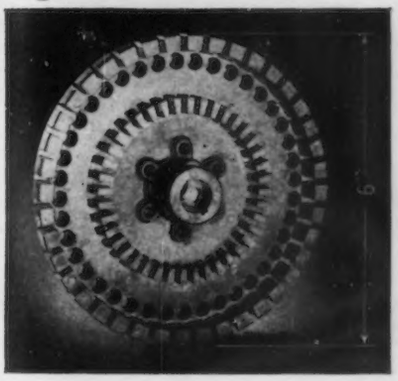
SHAPERS • SHEARS • BRAKES • PRESSES

WHY HAVEN'T *You* USED DIE CASTINGS ? A "Quiz"

Die casting is a production method of today—and tomorrow. It has assumed the status of a major engineering practice, yet its possibilities are only beginning to be explored. Why haven't *your* products, as yet, been modernized with ZINC Alloy Die Castings?

? Are you under the impression that the economies of die castings depend upon high production rates?



A The illustrated ZINC Alloy Die Cast part for a coin stamping machine has a limited production. It was recently changed from a "machined" part of another material, at a saving of $11.30 per casting.

? Have you regarded die castings as a means of eliminating assembly operations?

A It is not unusual to find ZINC Alloy Die Casting applications that have saved anywhere from 1 to 10 assembly operations. Note, for example, the many mounting, positioning and fastening elements incorporated in the *one piece* casting shown here. It is a part for a radio tuning device.

? Are you familiar with the range of finishes available for ZINC Alloy Die Castings—and the way they stand up?

A Here is a die cast ash tray—beautifully finished in chromium plate (it could have been finished just as easily in any of a wide variety of plated or organic coatings). Hard knocks, lighted cigarette and cigar butts make life tough for this plated coating. But, after two years, there is no sign of wear.

? Did you ever consider die casting as a possible method of fabrication *before* the design of a part was completed?

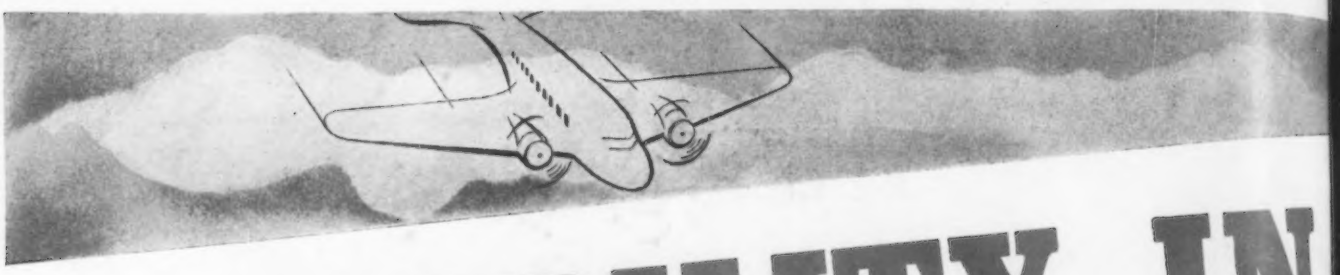
A If a commercial die caster is consulted early in the design stage he can advise as to the suitability of the part as a die casting—and make minor design suggestions to minimize casting cost.

You may have questions about ZINC Alloy Die Castings that are not answered here. Why not check your present production problems against the advantages offered by the die casting process? Consult any commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City.

ZINC ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are specified with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC



FLEXIBILITY IN A

Attributes of Alloy Steels

1. Flexibility—a steel for every application.
2. High physical properties.
3. Improved efficiency in large sections.
4. High fatigue qualities.
5. Heat-resistance—high creep strength.
6. High strength of welds.

REPUBLIC

ALLOY STEELS!

Means a steel for almost every purpose

● The wide range of alloy steels available today is a tribute to modern metallurgy. Think of the handicap under which industry would operate without the chrome-nickel and molybdenum steels for axles — the chrome steels for ball bearings and the chrome or molybdenum steels for gears.

In the making of alloy steels, the metallurgist has at his command many alloying elements. Nickel makes steel tough. Chromium imparts mineral hardness. Molybdenum promotes depth hardening. Vanadium facilitates grain control. Manganese aids the control of depth hardening. By combining these elements in varying proportions with iron and steel, alloys have been produced with the desirable qualities required for almost every specific use known today.

But research on alloy steels goes on — to find new steels for new uses — better steels for old uses — and less expensive steels that will cut your costs without penalizing the user of the manufactured product.

The selection of alloy steels is a matter of economics—service desired, chemistry of the steel, cost of steel, cost of processing in the plant. Republic's metallurgical staff will go into every phase of any steel problem that arises in your plant — at no cost to you. Just write.

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WORLD'S LARGEST PRODUCER OF

Alloy Steels

2 NEW FACTORIES Modern for Better

ELECTRODES — THAT'S ALL

Devoted exclusively to the manufacture of electrodes, two of the world's most modern electrode factories, now operating in full swing, produce all G-E electrodes. To assure strict uniformity, both plants are completely equipped with the latest streamlined production facilities. To make prompt shipment of all types and sizes without delay, they are located adjacent to steel mills—their principal source of raw material.

APPROVED BY AUTHORITIES

The high quality of these new modern G-E electrodes is evidenced by the fact that their use is permitted on work requiring the approval of Hartford Steam Boiler Inspection & Insurance Co., American Bureau of Shipping, Lloyd's of London, Southwestern Laboratories, and other recognized authorities.

NEW PRODUCTION FACILITIES
Provide new standards of uniformly high-grade electrodes

COMPETENT SUPERVISION
Of all manufacturing operations assures constant uniformity of product

GENERAL ELECTRIC

Now Make G-E Electrodes

Arc Welding

"SHOP-PROVED" BY GENERAL ELECTRIC

As further assurance of their ability to produce profitable results, G-E electrodes also are continually "shop-proved" by a most critical user—G-E shops. Keen competition compels General Electric to use the most efficient production tools obtainable. That's why G-E shops use more than a million pounds of G-E electrodes annually.

NATION-WIDE AVAILABILITY

National distribution service maintains local stocks for immediate delivery—thus minimizing the quantity a user needs to carry on hand to assure adequate supplies. You, too, may find it convenient and profitable to take advantage of this new, reliable source of outstanding electrode values. Call your G-E arc-welding distributor or G-E sales office for further information, a demonstration, samples, or help with your welding problems; or write General Electric, Schenectady, N. Y.

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Continually makes sure that G-E electrodes are representative of the best that modern science can produce

A COMPLETE LINE
of G-E electrodes is available for mild steel, high-tensile steel, cast iron, and other welding work

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The Issue With Extra Value For Advertisers

Published in connection with the outstanding annual event in the metal-working industry — the National Metal Show.

Planned, like the Show itself, for the benefit of the users of metals and sure to gain their attention and interest.

Advertisers benefit from this special interest and from the extra distribution provided. Then, too, the advertising will be carried in an India tint insert section.

Why not plan to make this issue the high spot of your fall campaign. Make your space reservation NOW.

Regular space rates apply. No extra charge for the special printing and additional distribution

THE IRON AGE

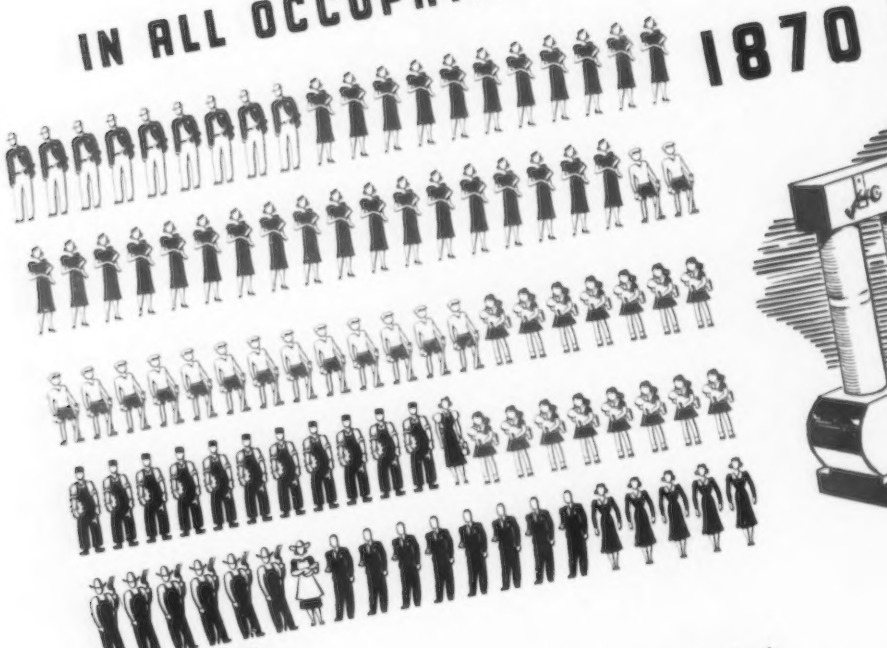
A Chilton Publication

239 West 39th St., New York

MORE!
MORE!
MORE!
WE WANT
WE WANT MORE
WE WANT MORE
WE WANT MORE

MORE MACHINES . .

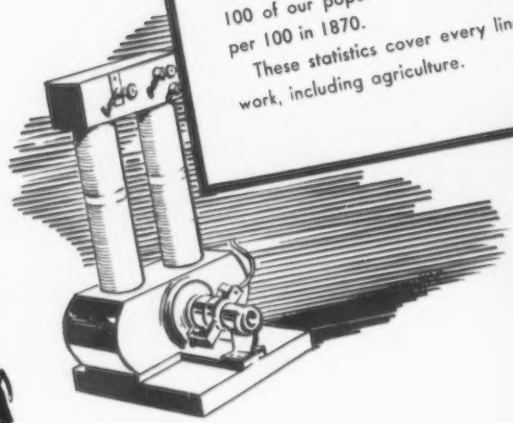
IN ALL OCCUPATIONS



CONSIDER the enormous flow of improved machinery going into all lines of endeavor since 1870. If machines displaced men, one would expect to find less people working, per 100 of population, after 60 years of invention and improvement.

Yet in 1930—latest year that census statistics are available—Government records show that we had 40 paying jobs available for every 100 of our population, contrasted with 32½ per 100 in 1870.

These statistics cover every line of gainful work, including agriculture.



IN the mechanical and manufacturing industries, improvement and invention have been more intense than in other branches of effort. That improved machines create jobs instead of destroying them is proved by the fact that the number of available jobs per 100 of population increased 36 per cent in the mechanical and manufacturing industries between 1870 and 1930, as compared with an increase of 23 per cent for all occupations. More machines—more jobs, even where the machines are thickest!

NOT only does improved machinery make more jobs but it also has enabled labor—the wage earner—to enjoy an increasingly larger share of each year's total national income.

Starting with a "labor share" of 53.2 per cent in 1900, we find it increasing in proportion year after year until in 1937 it was 67.4 per cent.

During the past 37 years of invention, improvement and intensive mechanization, labor's share of the total annual income has increased 26 per cent.

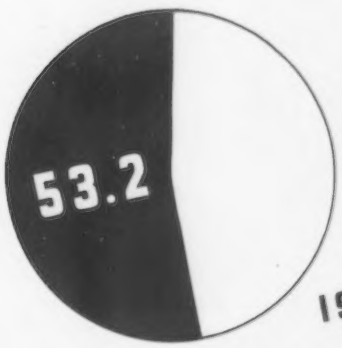
Spring these Government statistics on some of the misinformed people who say that our machine age has concentrated wealth instead of broadened its distribution.

1937

1929

1920

1914



1900

. . MORE JOBS

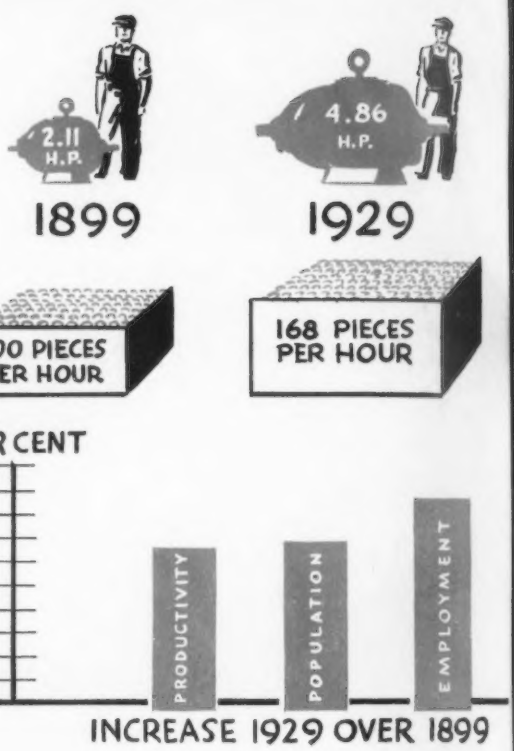
INCREASED PRODUCTIVITY DOES NOT CAUSE DEPRESSIONS

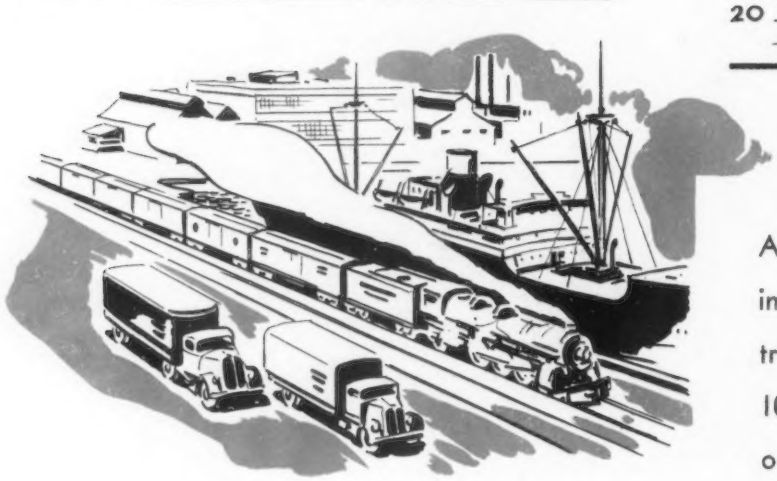
BETWEEN 1899 AND 1929

HORSE POWER PER WORKER INCREASED 130 PER CENT IN MANUFACTURING

AND PRODUCTIVITY PER WORKER IN MANUFACTURING INCREASED 68 PER CENT

POPULATION, DURING THIS PERIOD INCREASED 70 PER CENT. BUT EMPLOYMENT IN MANUFACTURING INCREASED 88 PER CENT





And, in addition to the 88 per cent increase in employment in the manufacturing industries, this increased activity created nearly 10 million additional jobs in the "service" occupations.

But Depressions May Cause Increased Productivity

When a man is afraid that he may lose his job it is only human nature that makes him put his best foot forward. That is why production per man hour reached an all time high in 1933, when machine tool orders were 87 per cent below normal.

Don't forget that since 1930, most of our improved "time saving" tools have been going abroad and not into American industry. Where is the unemployment that these have supposedly created?

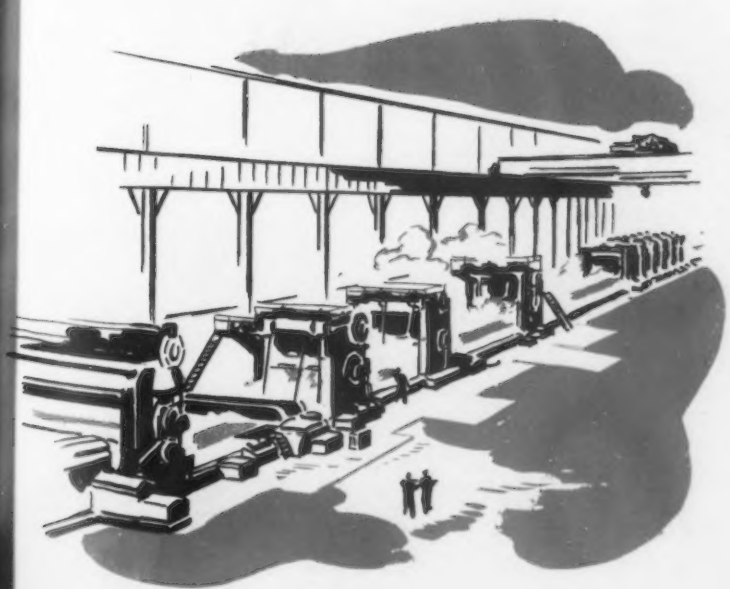
Machine Tools have gone abroad . . .
but Steel Mill Equipment has stayed home

SOMETHING must certainly be wrong with the theory that time-saving machines cause unemployment through fewer jobs. America has been making new machine tools intensively for Europe and Japan almost since our depression began. Yet there is no excessive unemployment in these countries.

As a matter of fact, because these improved tools being installed abroad decrease America's competitive advantage in manufacturing and selling to World trade, these nations add to our unemployment and decrease their own.

You cannot blame our tool builders for selling where they can. But it would have been better for American industry and American workers if we had bought and installed at home a much larger portion of the output.

. . . For, Take the Case of Steel Mill Equipment



SINCE the depression began the American steel industry has spent hundreds of millions of dollars for the improvement and modernization of American steel mills.

A part of this modernization has included extensive installations of continuous rolling mills. With these, a few men can do the work of many. They are outstanding time savers.

What has this done to steel mill employment? Just the opposite of what the technocrats and other crazycrats said would happen. Steel mill employment has steadily increased since the improvement in machinery began. Here is the record:

Year	Wage Earners in Steel Industry
1931	278,206
1933	288,945
1935	374,808
1937	513,000

Today, employment in steel is larger than it was in the prosperous year of 1929.

NEW JOBS FOLLOW NEW MACHINES

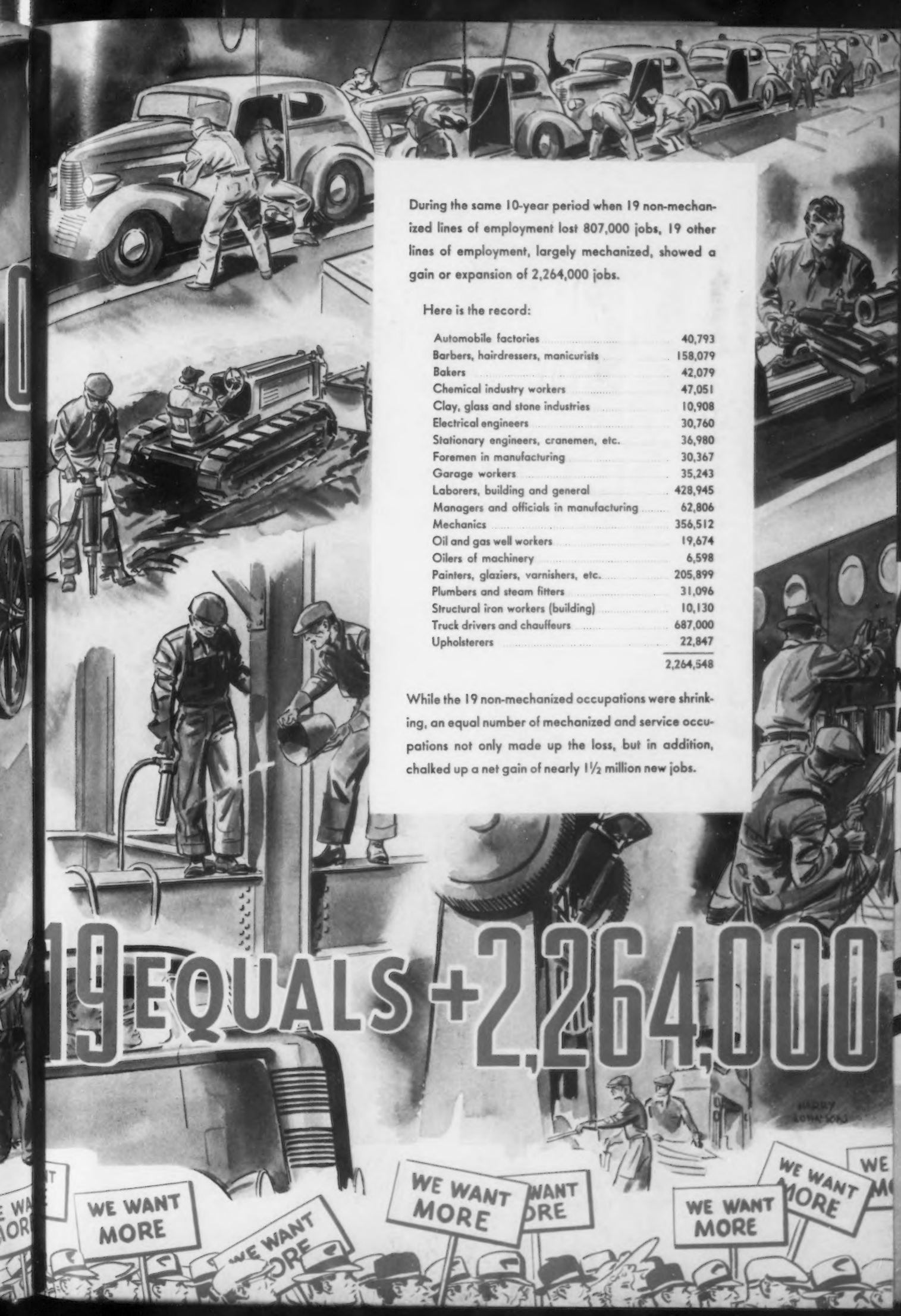
19 EQUALS —807,000

Old occupations are going out and new occupations coming in continually during our progress down the road of time • During the census period from 1920 to 1930, for example (last 10-year period for which we have records), 19 principal declining industries showed a net loss of 807,000 jobs.

Here is the record in detail:

Apprentices in building and hand trades	34,000
Apprentices to dressmakers	2,200
Apprentices, miscellaneous	26,000
Blacksmiths	74,000
Boilermakers	25,000
Coopers	8,000
Draymen	309,000
Dressmakers (home)	75,000
Firemen (in manufacturing industries)	16,000
Furnacemen, puddlers, etc.	5,000
Glass blowers	6,000
Jewelers and silversmiths	900
Millers, grain	7,300
Milliners and millinery dealers	29,000
Millwrights, tool makers, die setters	134,000
Molders and founders	18,000
Shoemakers	2,500
Stable hands	12,322
Tailors	23,000
	807,222

Note that there is very little mechanization and a great deal of "hand labor" connected with these declining industries.



During the same 10-year period when 19 non-mechanized lines of employment lost 807,000 jobs, 19 other lines of employment, largely mechanized, showed a gain or expansion of 2,264,000 jobs.

Here is the record:

Automobile factories	40,793
Barbers, hairdressers, manicurists	158,079
Bakers	42,079
Chemical industry workers	47,051
Clay, glass and stone industries	10,908
Electrical engineers	30,760
Stationary engineers, cranemen, etc.	36,980
Foremen in manufacturing	30,367
Garage workers	35,243
Laborers, building and general	428,945
Managers and officials in manufacturing	62,806
Mechanics	356,512
Oil and gas well workers	19,674
Oilers of machinery	6,598
Painters, glaziers, varnishers, etc.	205,899
Plumbers and steam fitters	31,096
Structural iron workers (building)	10,130
Truck drivers and chauffeurs	687,000
Upholsterers	22,847
	2,264,548

While the 19 non-mechanized occupations were shrinking, an equal number of mechanized and service occupations not only made up the loss, but in addition, chalked up a net gain of nearly 1½ million new jobs.

NOTHING NEW UNDER THE SUN

Unemployment is not new. And those who believe that it is a symptom of mechanization do not know their history. There were no machines at work in Sheffield, England, in 1615 A. D., when one-third of the population was on relief:

"By a survaie of the towne of Sheffild, made the second daie of Januarie 1615, by twenty-four of the most sufficient inhabitants there, it appeareth that there are in the towne of Sheffild 2207 people; of which there are 725 which are not able to live without the charity of their neighbours; these are all begging poore. One hundred householders which relieve other. These (though the best sorte) are but poor artificers; among them there is not one that can keep a teame on his own land, and not above tenn that have ground of their own that can keep a cow. One hundred and sixty householders not able to relieve others. These are such (although they beg not) as are not able to abide the storme of one fornight's sickness, but would be thereby driven to beggary. One thousand two hundred and twenty-two children and servants of the said householders, the greatest part of which are such as live of small wages, and are constrained to work sore to provide them necessaries."

There is nothing in the theory that suddenly, in 1930, machines decided to chase people out of jobs. The record shows that in seven different years prior to 1930, the number of unemployed, per 100 workers, was higher than in 1937. Even back in the "horse and buggy" days of 1897, it was 5 people per 100 higher than in 1937.

(Data from National Industrial Conference Board and from Dr. Paul Douglas's study of real wages in the United States.

IN the five presentations thus far published in this series, THE IRON AGE has offered indisputable proof that unemployment is not caused by mechanization. We have offered indisputable proof, on the contrary, that mechanization multiplies jobs.

"But if that is true, why have we 10,000,000 unemployed today?" That question we will endeavor to answer in the final chapter of this series, to be published Sept. 28.

HE MACHINE AGE OF TOMORROW

ecause it is geared to the production of only one roduct — because it concentrates on the building of illing machines exclusively—the K & T organization ore than keeps pace with today's needs and frequently anticipates tomorrow's demands in advanced illing machine design and construction.

he machine age of tomorrow will find in Milwaukee illing Machines the same high standards of performance it profits by today.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN, U. S. A.

IS ANTICIPATED IN THE MILWAUKEE MILLING MACHINE OF *Today!*

PROFIT MORE WITH K&T PRODUCTS

K&T *Milwaukee* **MILLING MACHINES**

You couldn't keep me away from it!

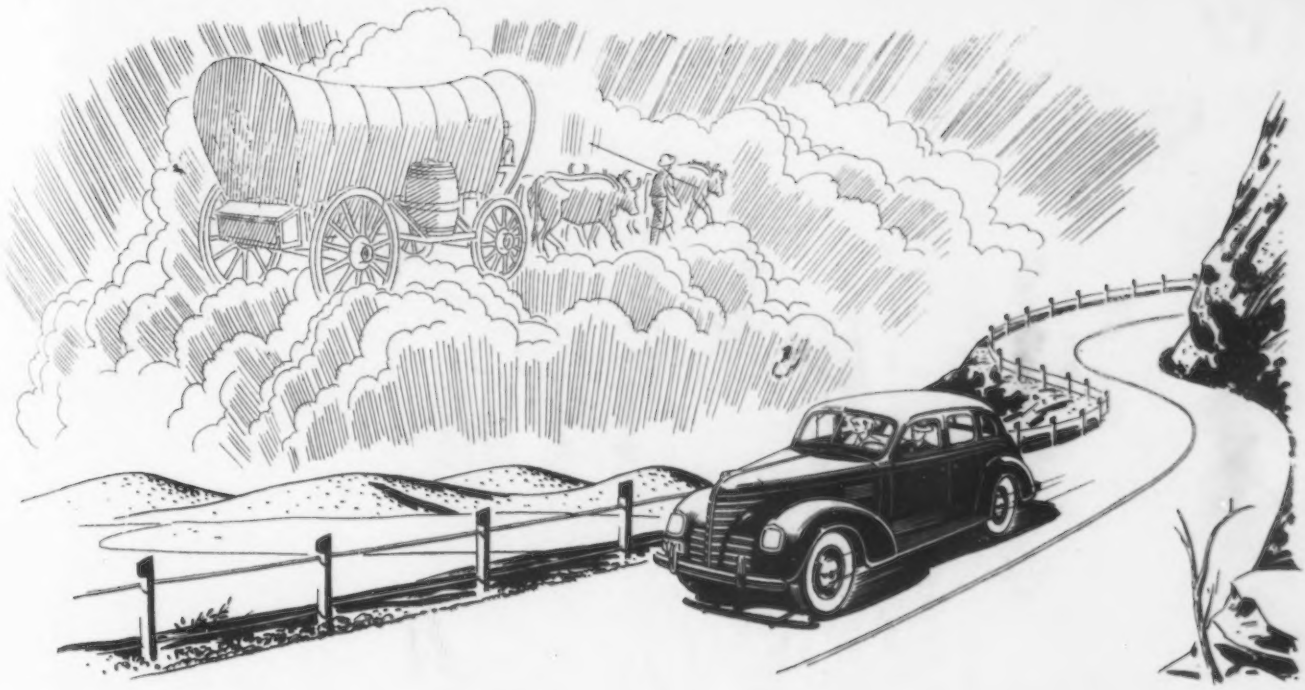
"AM I going to the Machine Tool Show? Why, listen, if they had me in Alcatraz I'd get away somehow to go to that show. That's something that a guy like me simply has to do. What I mean is, among production men there'll be just two kinds of people after October 13—those who went to the Machine Tool Show and those who didn't. I can't afford to be one of the second kind. And my boss is smart enough to know he can't afford to have me miss it. After the 1935 Show I came back with ideas that resulted in a number of changes in equipment. And believe me, every new machine tool we bought proved to be a wonderful investment. We had old machines that were costing us money to own, and the Machine Tool Show gave us just the information we needed to have. I try to keep up with the new things as they come out in the magazines and literature from the various machine tool builders, but there's nothing like seeing the machine itself and watching it operate. There at the Show in Cleveland I can see them all — every kind of machine tool with the very latest improvements — under one roof; and all the newest gadgets to go with them—a lot of them adaptable to our present equipment. I hear this year's Show is going to be even better than the one 4 years ago! That sounds hardly possible, but I'm not taking any chances. I'll be seeing you in Cleveland. . . . . ."

For full information, please address National Machine Tool Builders' Association, 10525 Carnegie Avenue, Cleveland, Ohio.

MACHINE TOOL SHOW OF 1939

CLEVELAND · OCTOBER 4TH TO 13TH

YOUR SMARTEST INVESTMENT TODAY . . . MODERN MACHINE TOOLS



AND GLEAMING HIGHWAYS

Replaced the Ox-Trails of Yesterday

IT WAS the slow but romantic covered wagon of the 19th century that opened up the trails when America started spreading its civilization into the Far West.

But the modern automobile of the 20th century has helped to form this civilization into a closely knit social and economic unit—the greatest nation on the earth today.

Only a few years ago the automobile was a rich man's luxury. Today it is an economic benefactor of rich man and poor man alike. It enables the city worker to live in the country, and the farmer to shop and play in the city. It gives *all* of us a new opportunity for education, travel and enjoyment.

But, most important of all, the automobile—and the men and machines that have created and built it—has provided new industries, new jobs, new prosperity for more than 6,000,000 men and women in America today.

Chrysler Corporation is a progressive part of that industry. In fourteen years it has grown from small beginnings to a great organization of men engaged in making fine products for human service and enjoyment. Today it provides a livelihood, directly and indirectly, for more than 1,000,000 people. Today every fourth car sold in the United States is Chrysler-built.

Chrysler Corporation looks forward to automotive advances in the future that will benefit America even beyond anything yet realized. It believes that the automobile industry will continue to make better products and provide more jobs. In this continuing progress, its engineering, manufacturing and distribution methods will always seek to justify the motto:

★ "YOU GET THE GOOD THINGS FIRST FROM CHRYSLER CORPORATION" ★

Chrysler Corporation

PLYMOUTH · DODGE · DE SOTO · CHRYSLER

Passenger and Commercial Cars — Passenger Cars and Trucks

CHRYSLER MARINE AND INDUSTRIAL ENGINES • AIRTEMP—AIR CONDITIONING

You will be WELCOME *at Exhibit* 5308

Here visitors to the Cleveland Show will take advantage of the opportunity to become familiar with the profit possibilities of the latest Jones & Lamson equipment, including several new machines never before displayed. . . . Plan now to be one of the first to visit this exhibit of Jones & Lamson machines built not only for the high speed tools of today but to handle the tools of tomorrow and handle them at a profit.

JONES & LAMSON MACHINE COMPANY, SPRINGFIELD, VERMONT, U. S. A.

"THE WHOLE GANG WILL BE THERE"

NEW developments in Automatic Thread Grinders

NEW Jones & Lamson Fay Automatic Lathe

NEW Jones & Lamson Turret Lathes

NEW developments in Comparators and Threading Dies

A Family Party

At the Public Auditorium in Cleveland from October 4th to 12th, you are invited to see the marked overall advance the Machine Tool Industry has made in the intervening lean and troublesome years since the previous Show in 1935.

By all means come and see the improvements made in the design, construction and control of present day machine tools.

An outstanding example of progress is the new model, large **LUCAS** Horizontal Boring, Drilling and Milling Machine.

Formal announcement, illustration and description will appear in the Show Issues of the Trade Papers.

THE LUCAS MACHINE TOOL CO.

NOW AND ALWAYS OF

CLEVELAND, OHIO

AT BOOTH 5310

MACHINE TOOL SHOW CLEVELAND

B·S

PROFITABLE EQUIPMENT

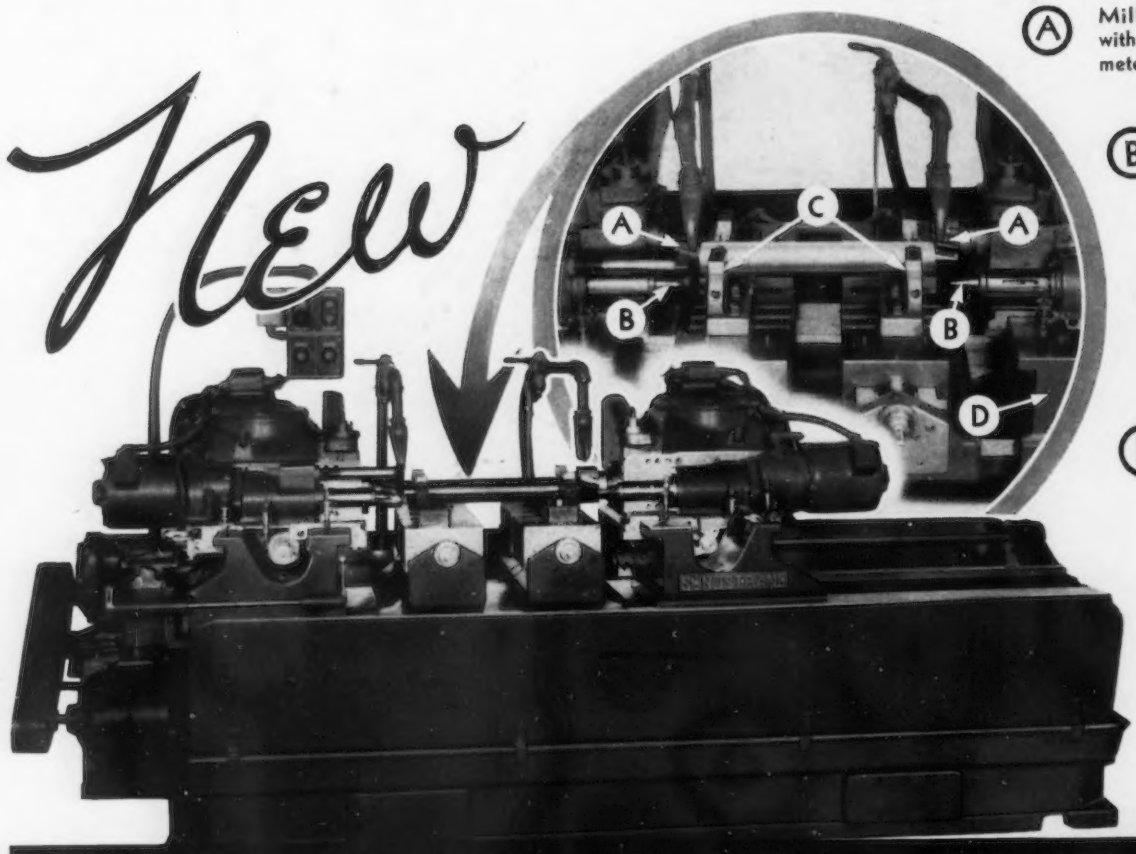
Milling Machines	Machinists' Tools
Grinding Machines	Cutters and Hobs
Screw Machines	Magnetic Chucks
Arbors and Adapters	Vises and Pumps
Screw Machine Tools	Miscellaneous Equipment

FOR PROFITS
MACHINE TOOL SHOW
M T
CLEVELAND
OCT. 4 to 13, 1939

Brown & Sharpe Mfg. Co.,
Providence, R. I., U. S. A.

OUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS

BROWN & SHARPE



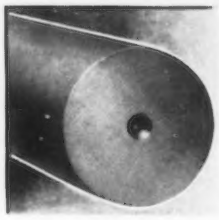
(A) Milling Cutters, each with independent micrometer adjustment.

(B) Center drills. High speed, automatic operation, positive control.

(C) Vise jaws, or other work-holding devices, standard or special.

(D) Transverse Ways for Milling and Centering Heads.

SUNDSTRAND Milling and Centering Machine



Faces and Centers Shaft-Ends ...in Quick Time!

Here is the latest development in Sundstrand Rigidmils! It face-mills both ends of work-pieces accurately to length . . . automatically center-drills both ends precisely . . . rapidly returns to start of operating cycle. Independent micrometer adjustment on cutter spindles provides extremely accurate control of lengths.

Operation — Set right hand milling head and vise for desired shaft length, place work-piece in position, pull starting lever. Twin slides rapid traverse across bed of machine; mill; rapid return to positive stop, in drilling position. Center drills rapid-approach, feed to depth, return and stop. Change work; repeat cycle. Operating cycle is completely automatic, with Sundstrand hydraulic actuation and control. As illustrated, work vises are manually operated; power-operated vises are available.

Capacity — Diameters to 3½", lengths from 7" minimum to 48" maximum. Maximum length with special long bed, 90". Investigate this Sundstrand Engineered Production Tool. Full information on request.

"YOUR SMARTEST INVESTMENT TODAY . . MODERN MACHINE TOOLS"

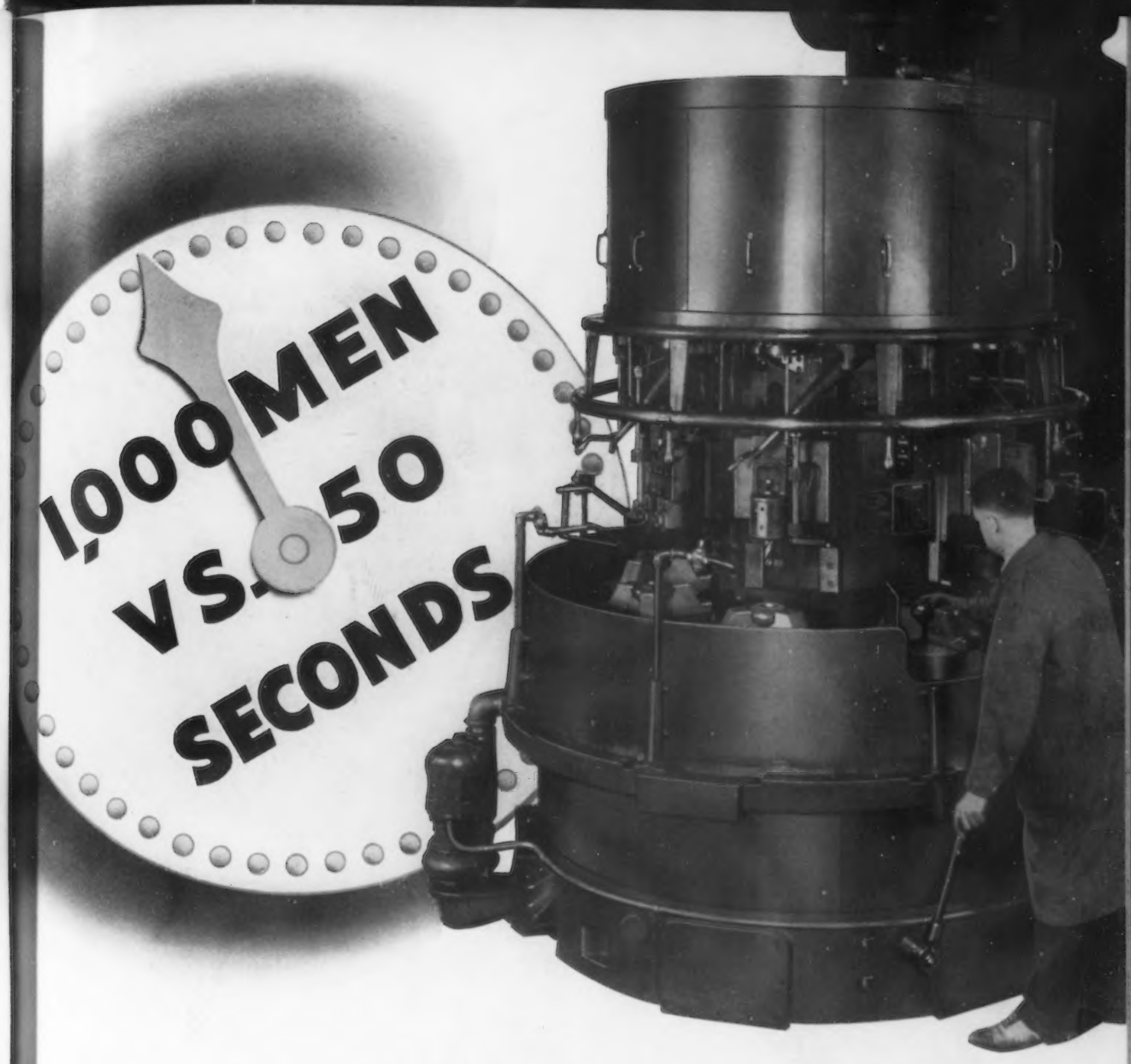
FOR PROFITS MACHINE TOOL SHOW
CLEVELAND
OCT. 4 to 13, 1939

SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Illinois, U. S. A.

RIGIDMILS-STUB LATHES

Tool Grinders - Drilling & Centering Machines
Hydraulic Operating Equipment - Special Machinery

SUNDSTRAND MACHINE TOOL CO. S ROCKFORD, ILLINOIS, U.S.A.



Over 1,000 men worked many days to build this Bullard Mult-Au-Matic—that *you* may save perhaps 50 seconds and a few cents.

But, even more important, those saved pennies and seconds represent increased sales, increased employment, increased profits *right in your own plant,* as Mult-Au-Matics play their part in helping you to build a better product for less money.

The wide scope of the Bullard Mult-Au-Matic is often not fully appreciated, even by those who own one. A wide range of sizes permits applying the Mult-Au-Matic Method to thousands of jobs even when the runs are as low as 250.
If you doubt the completeness of your information—send for a Bullard Engineer.

BULLARD

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

MULT-AU-MATICS

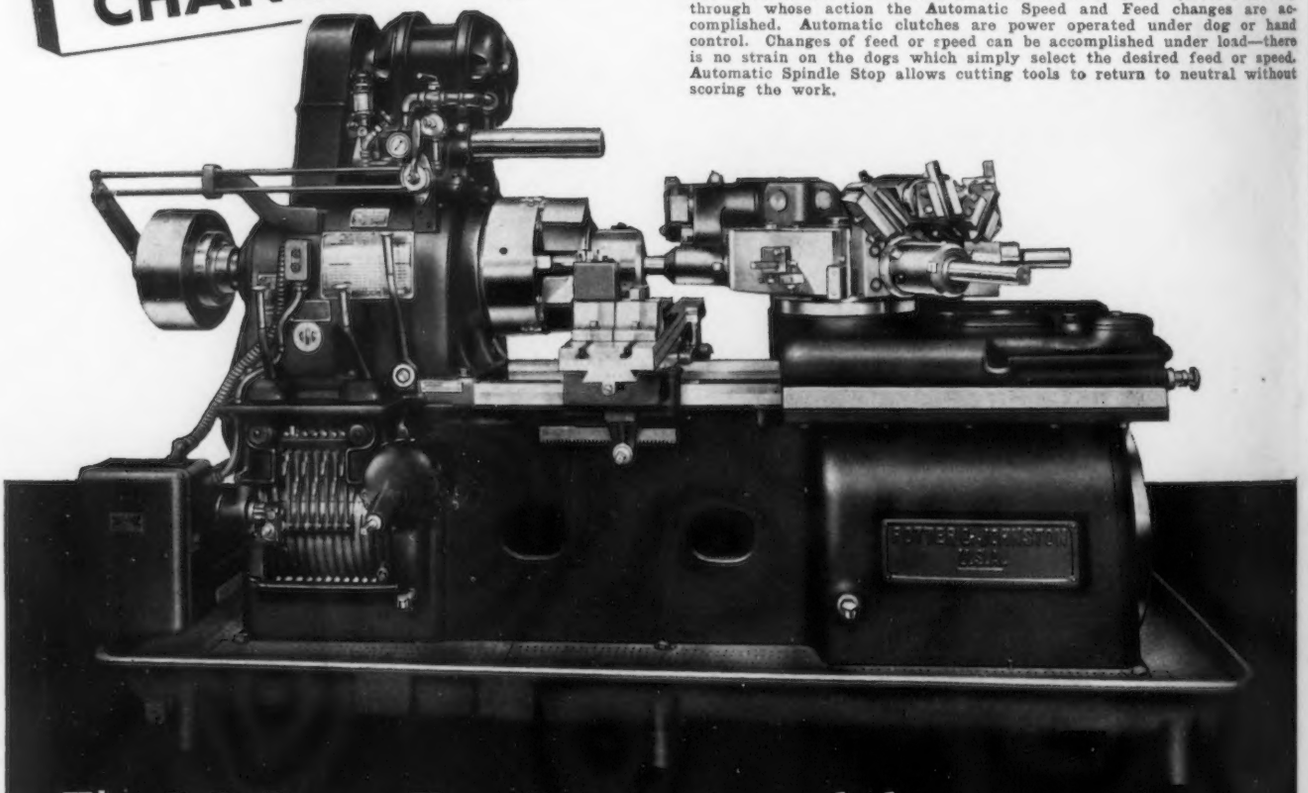
FEATURES OF P&J POWER-FLEX CONSTRUCTION

for the 5-D Automatic Chucking and Turning Machine

FORTY years' specialized experience in producing, designing and building automatic chucking and turning equipment has resulted in this highly efficient, extremely versatile and flexible, high production 5-D Power-flex. Certain advantages and features combine to produce rigidity—power—precision—and speed—and all of these result in dependable and profitable performances! Illustrated here are the Automatic Speed and Feed Changes, which play so important a role in modern, high production programs. This is fully described in relation to the other P & J Advantages, in the newly published Bulletin 108. Write for your copy.

The AUTOMATIC SPEED and FEED CHANGES

The insert at the left illustrates the SELECTOR UNIT (cover removed) through whose action the Automatic Speed and Feed changes are accomplished. Automatic clutches are power operated under dog or hand control. Changes of feed or speed can be accomplished under load—there is no strain on the dogs which simply select the desired feed or speed. Automatic Spindle Stop allows cutting tools to return to neutral without scoring the work.

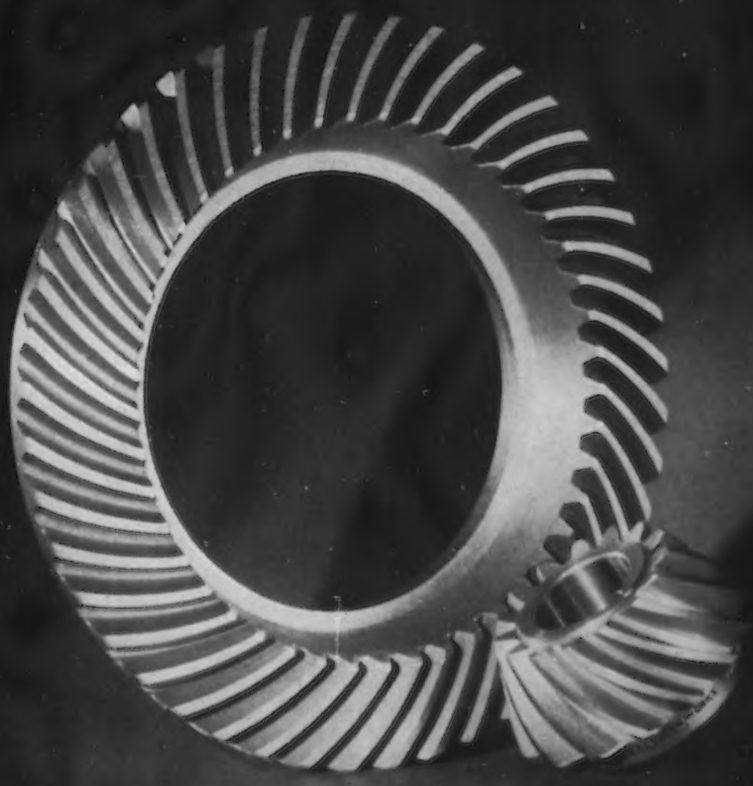


The **5-D Power-Flex Automatic** *made by*

POTTER & JOHNSTON MACHINE COMPANY, Pawtucket, R. I., U. S. A.

FACTORY REPRESENTATIVES: William L. Martin, Headquarters at Factory: New England States and Eastern New York and New Jersey; A. W. Stone, 986 Kenyon Ave., Plainfield, N. J.: Western New York and New Jersey, Eastern Pennsylvania, Maryland and Delaware; G. Tell DuBois, 8-154 General Motors Building, Detroit, Michigan: Michigan and the City of Toledo, Ohio; Louis K. Voelk, 14014 Woodworth Road, East Cleveland, Ohio: Ohio—with the exception of Toledo, and Western Pennsylvania; Harry I. Schuster, 743 N. Fourth St., Milwaukee, Wisconsin: Illinois, Missouri, Wisconsin, Iowa and Indiana. **AGENCIES:** Star Machinery Company, 1741 First St., South, Seattle, Washington; Henes-Morgan Machinery Co., 2026 Santa Fe Ave., Los Angeles, Calif.; Jenison Machinery Co., 20th and Tennessee Sts., San Francisco; Wessendorff, Nelms & Co., Inc., 317 Preston Ave., Houston, Tex.; Arthur Jackson Machine Tool Co., 60 Front St., West, Toronto 2, Ontario; Arthur Jackson Machine Tool Co., 437 Grosvenor Ave., Montreal, Canada; Burton Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France; Rotterdam, Holland and Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Vaghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan; (Imperial Export Co., 44 Whitehall St., New York, N. Y.); Almacoa, Zurich, Switzerland; Be-Te-Ha, Warshau, Poland; Schuchardt et Schutte, Budapest, Hungary; Bourla Freres, Istanbul, Turkey.

CURVED-TOOTH BEVEL GEARS
... FOR PRECISION,
SMOOTHNESS,
AND STRENGTH

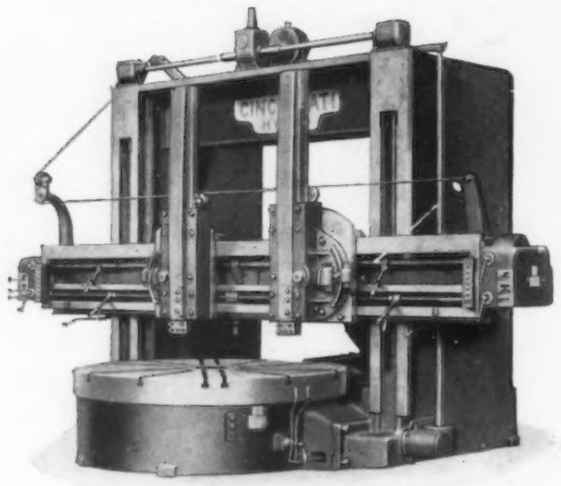


SEE GLEASON
BEVEL GEAR EQUIPMENT
AT MACHINE TOOL SHOW

GLEASON WORKS
Builders of Bevel Gear Machinery for Over Seventy Years
1000 UNIVERSITY AVENUE, ROCHESTER, N. Y., U. S. A.

TIME-SAVINGS *Expand* MARKETS

--and here is a time-saver!



Time-savings contain the seeds of prosperity. They lead to greater productivity, lower selling prices, and wider markets. The result is more jobs for workers.

So consider this 8 foot Cincinnati Hypro Vertical Boring Mill in its relation to your time-saving equipment. It has every refinement of design, construction, materials, lubrication, control feeds and speeds, ease of operation, and power application that combine to make time-saving a reality.

Elimination of strain in stress-absorbing zones gives you a plus value in the form of smoother finish on all classes of work. Write for our descriptive booklet.

FOR PROFITS MACHINE TOOL SHOW
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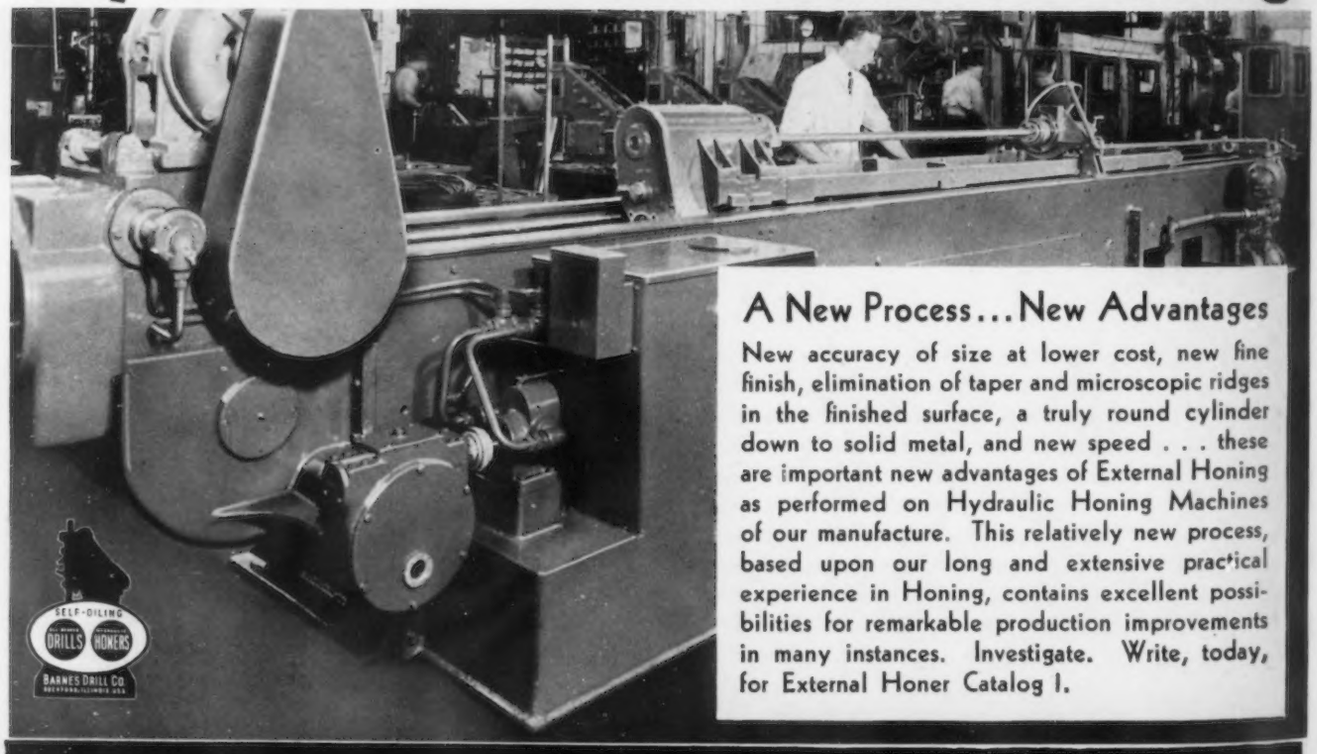
THE CINCINNATI PLANER CO.

CINCINNATI, OHIO, U. S. A.

Hydraulic *External* Honing



A New Process... New Advantages

New accuracy of size at lower cost, new fine finish, elimination of taper and microscopic ridges in the finished surface, a truly round cylinder down to solid metal, and new speed . . . these are important new advantages of External Honing as performed on Hydraulic Honing Machines of our manufacture. This relatively new process, based upon our long and extensive practical experience in Honing, contains excellent possibilities for remarkable production improvements in many instances. Investigate. Write, today, for External Honer Catalog 1.

BARNES DRILL CO. 815-831 CHESTNUT STREET ROCKFORD, ILLINOIS, U. S. A.

In the New FORD Tool Room

where only efficient precision will do . .

MASTER Super Service RADIALS

In this new tool room, which is one of the largest and finest in the country, two Master Super Service Radials are installed. They are handling the drilling and boring of large automobile body dies with precision and efficiency. This work and similar big jobs such as huge generator housings, turbine casings, Diesel engine frames, and large machine parts, present unusual problems and call for an unusual radial drill. Such work is all within the range and capacity of these new 40HP Master Super Service Radials. They are built in sizes from 7' arm with 22" diameter column up to the largest size ever built having 12' arm and 26" diameter column.

Write for a full description of these remarkable machines.

Left—8' Master Super Service Radial having 22" diameter column and special base to permit set-up while drilling

Below — 10' Master Super Service Radial having 26" diameter column and special base to permit continuous and simultaneous drilling and lay-out work.

THE CINCINNATI BICKFORD TOOL CO.

OAKLEY · CINCINNATI · OHIO · U. S. A.

Reducing to a NEW LOW

The Cost of Grinding Cemented Carbide Tools . .

NORTON METAL BONDED DIAMOND WHEELS

HERE'S a diamond wheel that can really "take it"—a wheel so durable that it will outlast several resinoid bonded diamond wheels on the offhand grinding of single-point cemented carbide tools—a wheel so strong that it resists grooving and rounding of the corners.

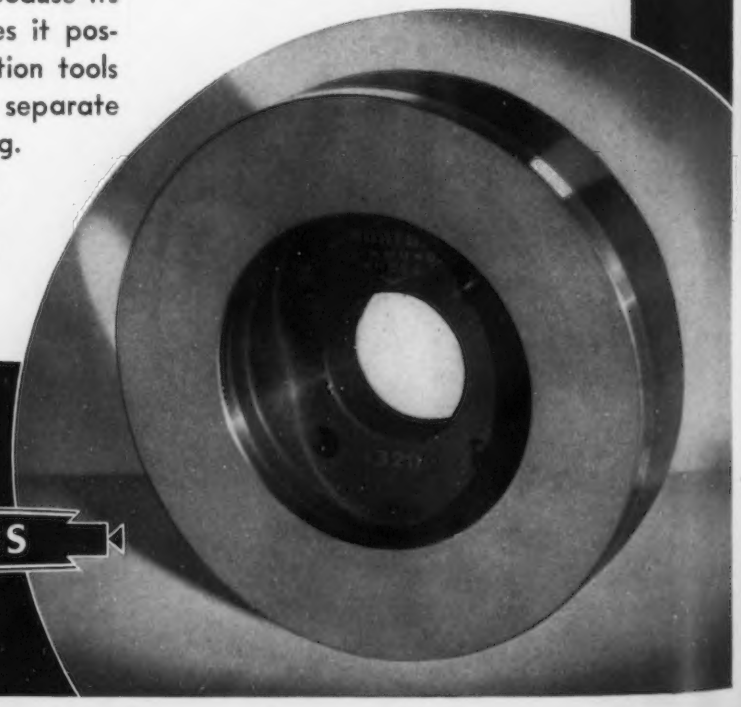
In this new Norton Metal Bonded Wheel the diamonds are actually imbedded in solid metal—a special alloy that holds the tiny diamond particles securely to resist the severe usage for which this wheel is specifically recommended.

Not only is this Norton Wheel cutting costs because of its long life and resistance to damage but also because its smoother grinding action makes it possible in many cases to recondition tools with one wheel instead of two separate wheels for roughing and finishing.

Full information on request

NORTON COMPANY
WORCESTER, MASS.

W-727



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WE'RE BUSY IN WORCESTER TODAY!

From Engineering Dept.

To Box Car

BUILDING MACHINES FOR THE WORLD OF TOMORROW!

These new and re-designed Precision Grinding and Boring Machines will first be shown at the Machine Tool Exhibition in Cleveland, Oct. 4-14 th.

The HEALD Machine Co.
WORCESTER, MASSACHUSETTS

USE A HEALD FOR

PRECISION • PRODUCTION • PROFIT

MARVEL Saws

RESTRICT AUTOMATIC MACHINERY
and you RESTRICT WAGES

How many people would buy $100,000.00 automobiles, $500.00 vacuum cleaners - - or entirely hand made stoves, watches, or cameras?

How many suits of hand woven cloth could you afford? The American Standard of Living is a product of automatic production machines. Without America's mass production and methods, the salaries of the highest paid executives could not buy the ordinary comforts and furnishings found in the most humble American Homes. America's past has been built on the development and perfection of automatic production machine tools. America's hope and future wait the development of even more efficient machine tools.

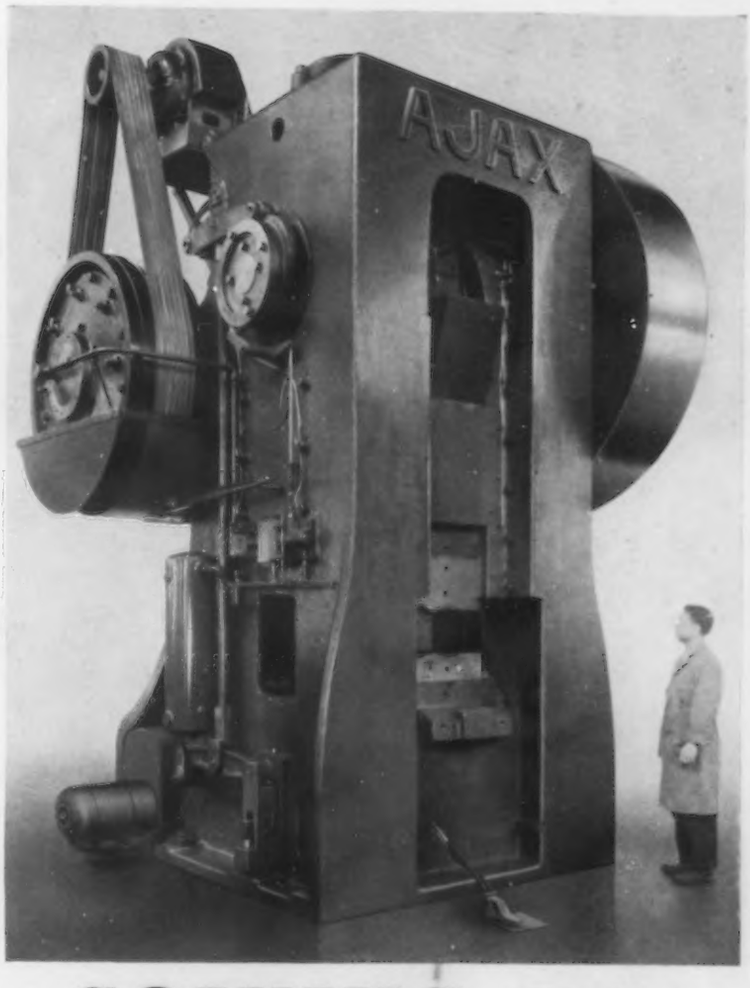
In keeping with this trend MARVEL has led in the design and manufacture of more efficient metal sawing equipment. From a small dry-cutting general-purpose shop saw, the MARVEL Line has grown into a complete System of Sawing providing unbreakable, High-Speed-Edge Blades, all-ball bearing High Speed Hack Sawing Machines, a universal metal-cutting Band Saw, High Speed Production Saws with automatic bar push-up, and a giant Hydraulic Hack Saw designed especially for tomorrow's larger sizes and tougher alloy steels.

ARMSTRONG-BLUM MFG. CO. CHICAGO . . U. S. A.
"The Hack Saw People"

5749 Bloomingdale Ave. Eastern Warehouse and Sales: 199 Lafayette St., New York.

AJAX

Solid Frame FORGING PRESSES *for* Most Accurate



FORGING *and* COINING

Rear Extension Guided Ram with Pitman of Rolled Steel

- The forging illustration at right shows the three progressive stages in the production of Ring Gear Blanks. Thousands of such blanks are being forged daily on huge Ajax Solid Frame Forging Presses in several of the large automobile plants.
- In multiple operation forgings of this type some of the die impressions must be offset from the center of the ram, with resulting off-center pressures. On the Ajax Presses the exclusive rear extension guide bearing and great overall guided length keep the ram rigidly in line despite off-center pressures.
- The rolled steel pitman on Ajax Presses is completely accessible for inspection, adjustment or disassembly.

Write for Bulletin No. 75

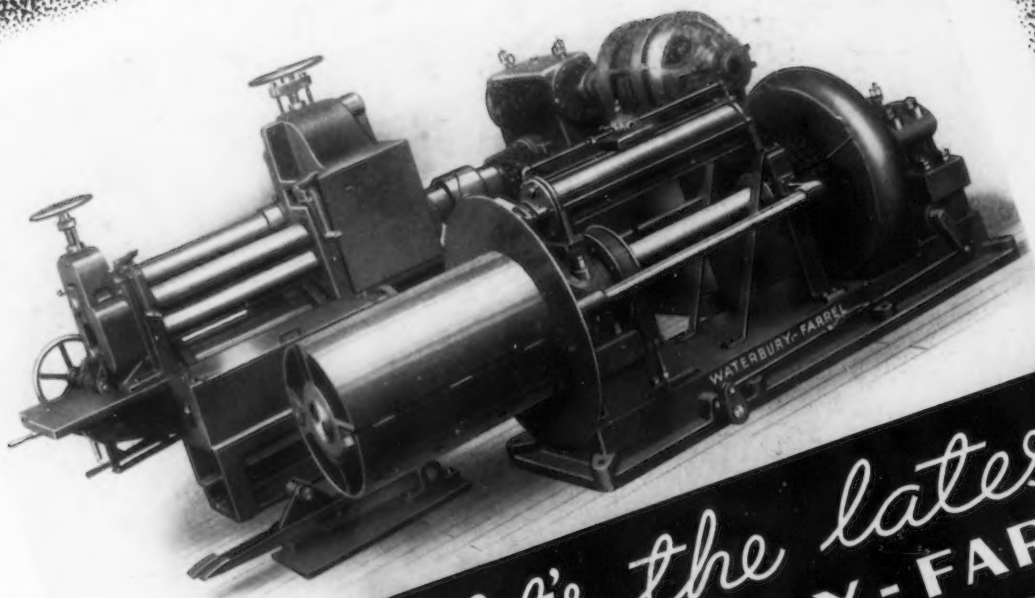
Automobile Rear Axle Ring Gear

THE AJAX MANUFACTURING COMPANY

621 Marquette Bldg. Chicago, Ill.

EUCLID BRANCH P. O. CLEVELAND, OHIO

201 Dewart Bldg. New London, Conn.



It's the latest WATERBURY-FARREL GANG SLITTER and WINDER

If you use large quantities of metal in various widths, you can not afford to be without efficient slitting machinery for making your own strip. It's economy.

A Heavy Duty Gang Slitter, flexible-coupled worm gear motor drive; a winder, chain-driven from the slitter, with 24″ collapsible drum suited to either "slip friction" or "pull-through" operation, and a compound air push-off suitable for 7000 pound coils; an independent motor-driven rotary scrap-cutter.

Similar equipment available in sizes to suit any slitting requirement; also mill-type slitters for trimming and numerous special purpose slitting machinery. See Circular 898-S.

FOUNDED WATERBURY FARREL 1851

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

WATERBURY • CONNECTICUT • U·S·A

• CUTTER EQUIPMENT • SCRAP CUTTERS • WINDERS • COILERS •

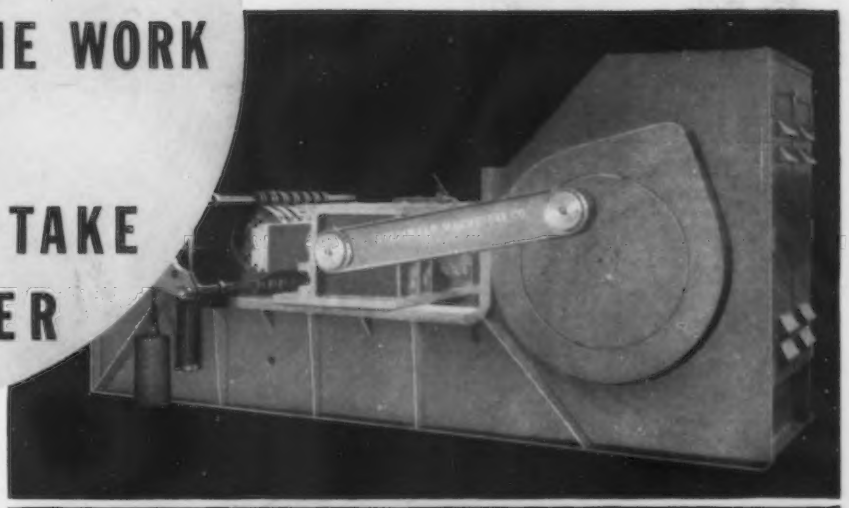
STEELWELD BULLDOZERS

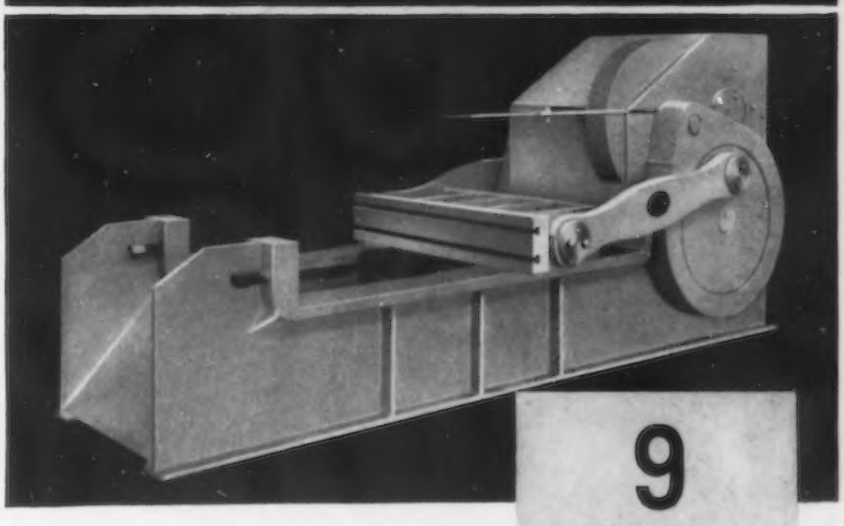
combine

POWER TO DO THE WORK

with

A FRAME TO TAKE THE POWER





• Steelweld Bulldozers with their adjustable die holders, their high alloy crank and ram pins, anti friction bearings, easily adjusted twin disc clutch or direct motor drives, fully enclosed dust tight housings, and with the ram gibbing protected under the hardened and ground ram ways—are fully representative of Steelweld's traditionally high engineering and manufacturing standards.

All steel construction provides at the outset an anvil-like frame rigidity against which the power can be delivered. This construction —a patented feature—available only in Steelweld Press Brakes and Bulldozers, creates a frame so strong that the motor stalls before the ram jams tight. Steelweld Bulldozers *cannot break their frames or tie themselves up.* Service records of five years' operation and full details of the design and construction of these bulldozers that give you today the operating advantages you will insist upon tomorrow, are available on request. Write for descriptive literature.

9

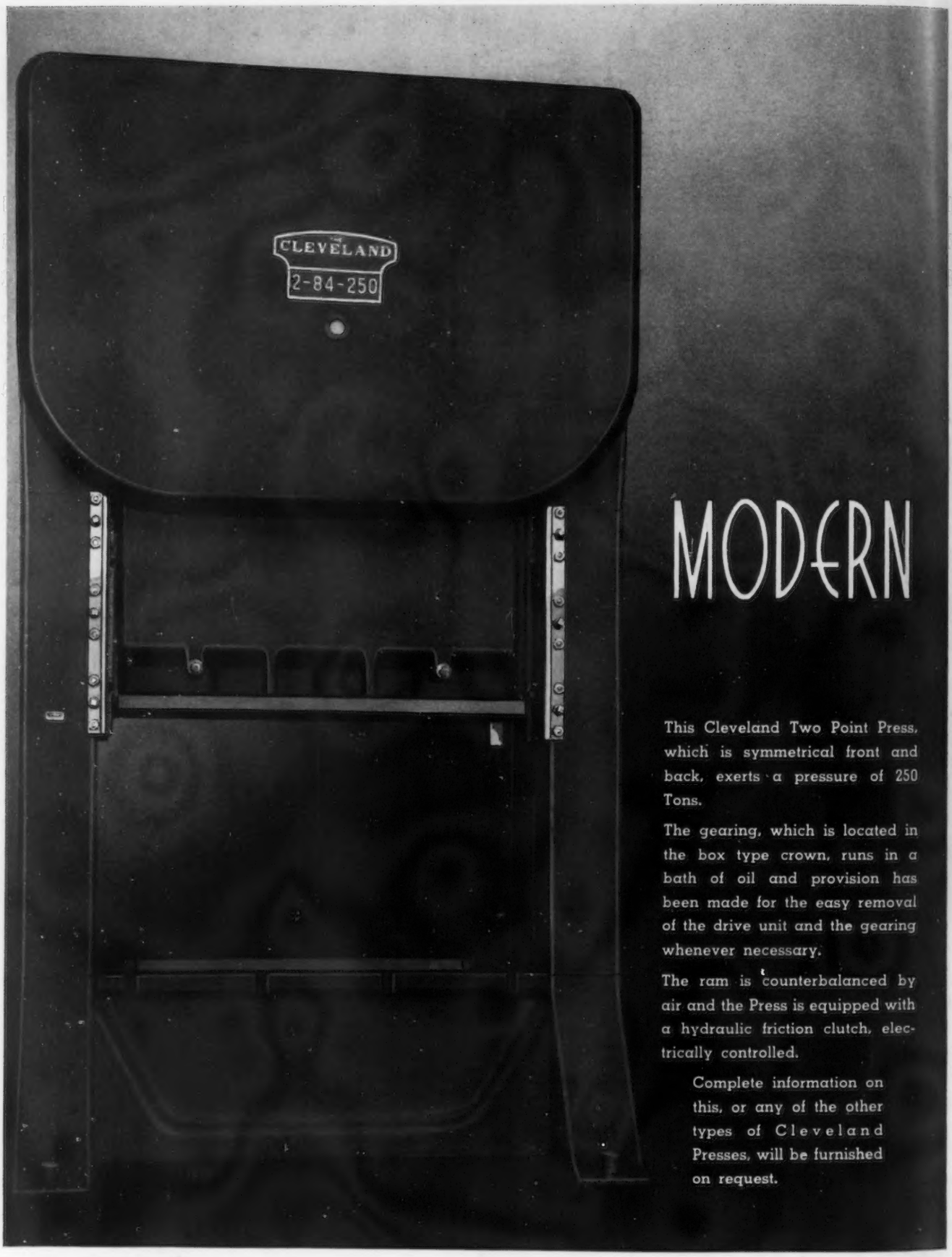
sizes are shop standard . . . What are your requirements?

THE CLEVELAND CRANE & ENGINEERING CO.

STEELWELD MACHINERY DIVISION

WICKLIFFE, OHIO.

CYRIL BATH & CO., GENERAL SALES AGENTS . . . . E. 70TH & MACHINERY AVE., CLEVELAND, OHIO



MODERN

This Cleveland Two Point Press, which is symmetrical front and back, exerts a pressure of 250 Tons.

The gearing, which is located in the box type crown, runs in a bath of oil and provision has been made for the easy removal of the drive unit and the gearing whenever necessary.

The ram is counterbalanced by air and the Press is equipped with a hydraulic friction clutch, electrically controlled.

Complete information on this, or any of the other types of Cleveland Presses, will be furnished on request.

Modern Presses THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

Which H-P-M PRESS BEST FITS MY PRODUCTION NEEDS?

The big question confronting every production engineer about to install a new press is, "Which press will give me dependable service . . . will speed up production . . . anticipate my production needs both today and tomorrow?"

The answer lies in an H-P-M FASTRAVERSE PRESS – and here are the reasons why.

An H-P-M Fastraverse Press is a versatile press. It can be built to meet every metal working requirement from the simplest operation to the deepest draw – without deviating from the fundamental principles of design and construction which have made H-P-M FASTRAVERSE PRESSES dependable, high speed production tools. These accomplishments have been made possible through the exclusive H-P-M Closed Circuit Fastraverse System of operation with its positive control over every press movement.

"Which H-P-M Press best fits my production needs?" is best answered by calling in an H-P-M engineer for consultation.

HPM

THE HYDRAULIC PRESS MFG. COMPANY
Mount Gilead, Ohio, U. S. A.

District Offices: New York, Detroit, Chicago
Representatives in Principal Cities

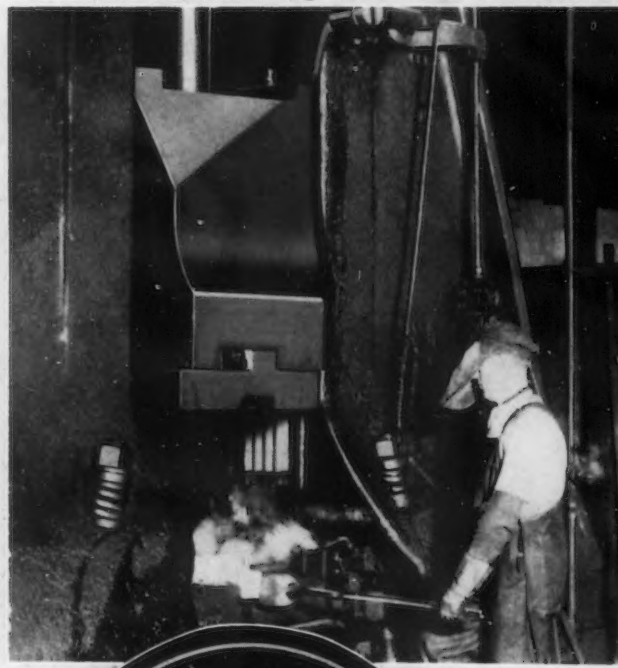
FASTRAVERSE PRESSES

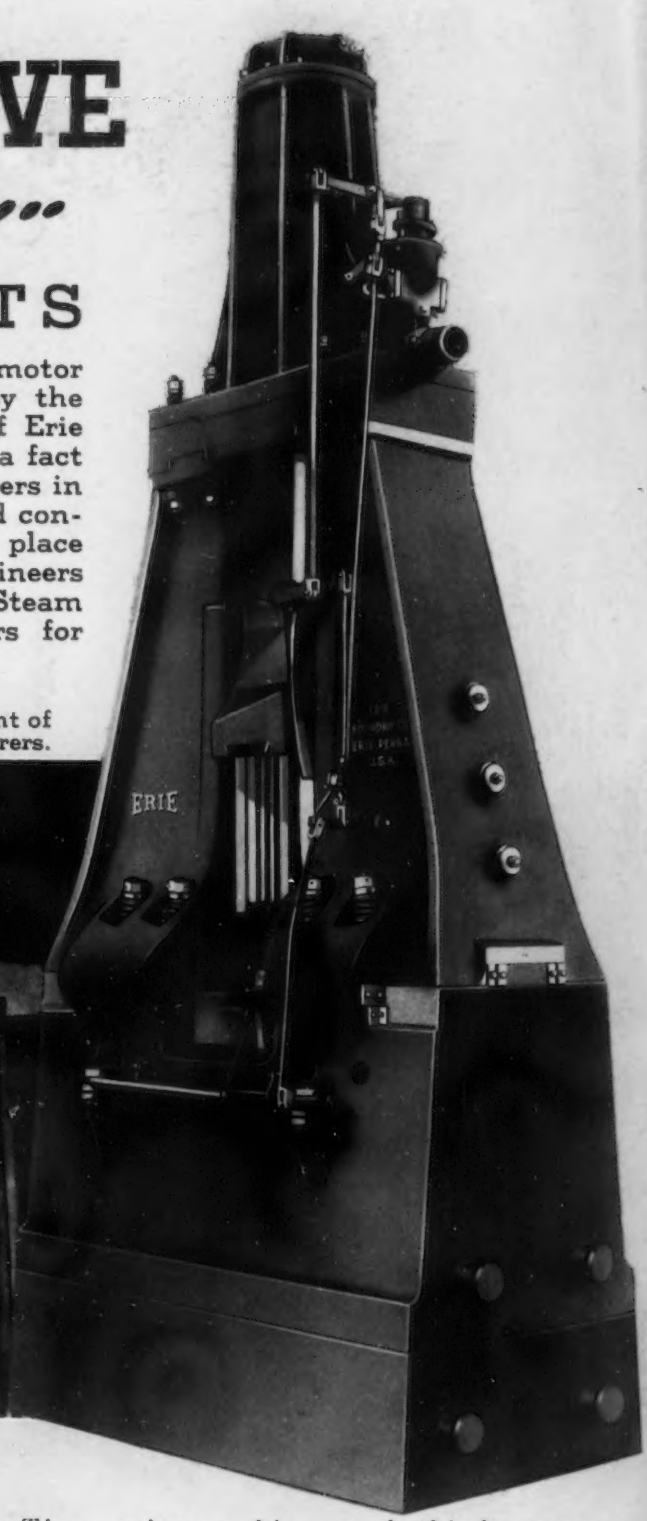
With their exclusive CLOSED CIRCUIT System

AUTOMOTIVE *Forgings* ... LOWER COSTS

. . . for forgings vital to today's speedy motor cars, trucks and buses are assured by the dependable and accurate operation of Erie Steam and Board Drop Hammers . . . a fact proven by the long use of these hammers in the industry . . . 36 years of design and construction progress are yours when you place your forging problems before Erie engineers . . . Bulletins No. 325 and No. 328 on Steam and Board Drop Hammers are yours for the asking.

Turning out lower cost forgings in the plant of one of the leading automobile manufacturers.





ERIE

Time-saving machines made this hammer.
Making this hammer made many jobs for men.

ERIE FOUNDRY CO.
ERIE, PENNSYLVANIA, U. S. A.

DETROIT	CHICAGO	INDIANAPOLIS
335 Curtis Bldg.	549 Washington Blvd.	335 Postal Station Bldg.
FRANCE	**CANADA**	**ENGLAND**
Fenwick, S. A.	John Bertram & Sons Co., Ltd.	Burton, Griffiths & Co., Ltd.

ERIE BUILDS *Dependable* HAMMERS

270 INCH SCALE LENGTH

SOUTHWARK TATE·EMERY 5-50

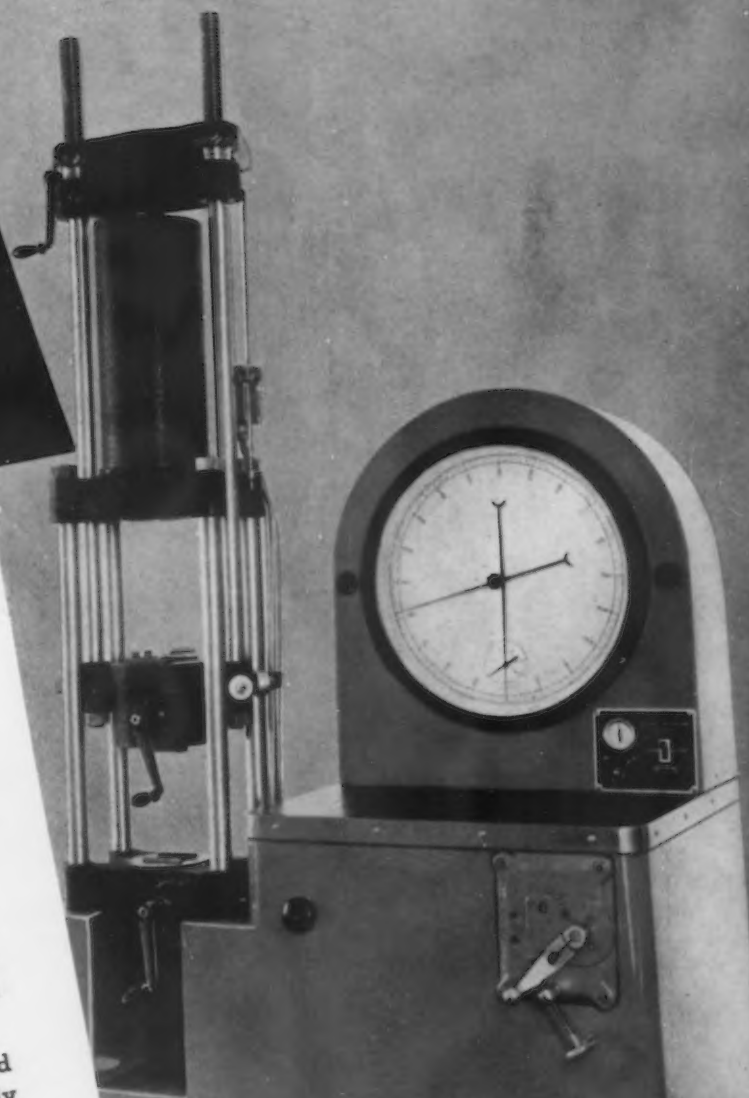
With a scale length more than four times longer than any other machine, the Southwark-Tate-Emery 5-50 makes possible easy and accurate dial readings.

A product of research, the 50,000-lb. capacity 5-50 embodies the latest Tate-Emery null method, servo-operated indicator combined with a lapped ram and cylinder unit of excellent construction.

Here is the ideal machine for the limited budget. Self-contained, and completely standardized, the 5-50 is extremely sensitive and accurate — especially in the low ranges. It is a Southwark-Emery quality machine for the medium price field.

Baldwin-Southwark Corp., Philadelphia; Pacific Coast Representative, The Pelton Water Wheel Co., San Franciso.

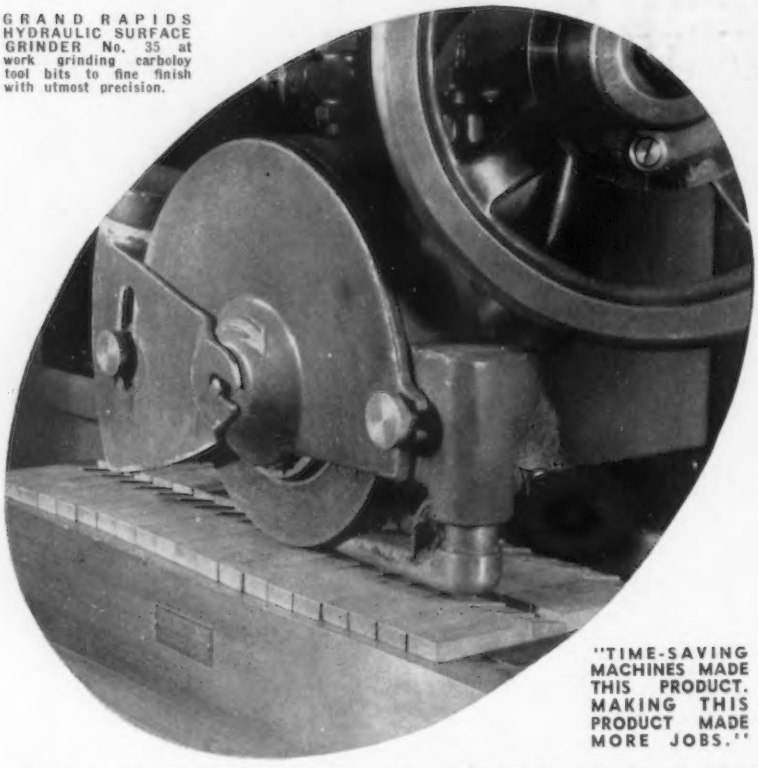
SOUTHWARK EMERY TESTING MACHINES



50,000-lb. Southwark-Tate-Emery Universal Testing Machine

ON THE JOB . . . . *Where the Going is* TOUGH

GRAND RAPIDS HYDRAULIC SURFACE GRINDER No. 35 at work grinding carboloy tool bits to fine finish with utmost precision.



"TIME-SAVING MACHINES MADE THIS PRODUCT. MAKING THIS PRODUCT MADE MORE JOBS."

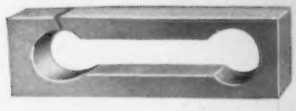
GRAND RAPIDS
HYDRAULIC FEED
SURFACE GRINDERS

Every machine in the GRAND RAPIDS LINE, offers these among many other advantages: easy accessibility to hydraulic assembly from front or rear—extreme accuracy and fine finish at maximum longitudinal table speeds—elimination of oiling time. This grinder has the smooth high speed that you need to do the finest accurate work.

Send for the new catalog GL-100 illustrating the latest in hydraulic feed surface grinders.

GALLMEYER & LIVINGSTON CO. 303 STRAIGHT AVENUE, S. W. GRAND RAPIDS, MICHIGAN

DoAll SMASHES RECORD Making Short Run "Forgings"



At Windcharger Corp., Sioux City, Ia., small runs of forgings are made by contour sawing the shapes from solid blocks of steel. They write, "This small brake lever would have meant a monotonous day on the shaper for somebody, but sawing it out on your DoAll took exactly 1½ hours." Quick, accurate, *clean* "forgings" without any die cost is another DoAll achievement. No material is wasted.

DO-ALL Contour Machine BAND SAWING BAND FILING BAND POLISHING

FREE—New Hand Book on Contour Machining — 100 pages of valuable metal working helps.

UNMATCHED PERFORMANCE

Contour Sawing, the new DoAll process of machining, is recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10″ thick.

Does work of 3 machines. DoAll is a moderately priced, rugged, precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

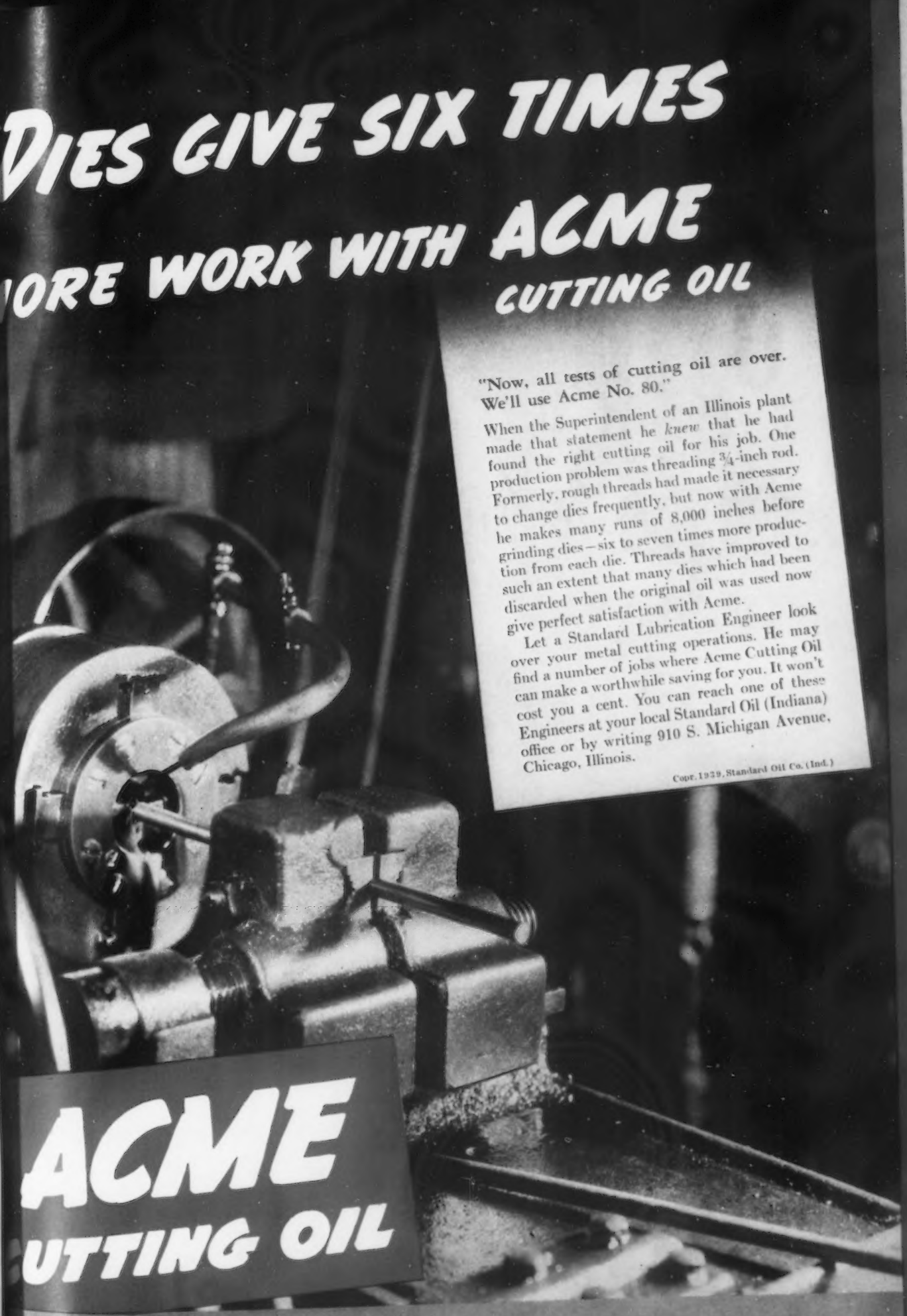
Used in large and small plants in 30 countries, by such firms as Underwood, Elliott Fisher, Atwood Vacuum Machine, Taft Pierce, New Monarch Machine, Lectrolite, Federal Cartridge, Waterman Waterbury, Lincoln Engineering, General Instrument, etc.

Let a factory trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

CONTINENTAL MACHINES, INC.
1311 S. Washington Ave. Minneapolis, Minn.

☐ Send data on the DoAll. ☐ Send Free Hand Book. LA-9
NAME .....
ADDRESS .....

DIES GIVE SIX TIMES MORE WORK WITH ACME CUTTING OIL



"Now, all tests of cutting oil are over. We'll use Acme No. 80."

When the Superintendent of an Illinois plant made that statement he *knew* that he had found the right cutting oil for his job. One production problem was threading ¾-inch rod. Formerly, rough threads had made it necessary to change dies frequently, but now with Acme he makes many runs of 8,000 inches before grinding dies—six to seven times more production from each die. Threads have improved to such an extent that many dies which had been discarded when the original oil was used now give perfect satisfaction with Acme.

Let a Standard Lubrication Engineer look over your metal cutting operations. He may find a number of jobs where Acme Cutting Oil can make a worthwhile saving for you. It won't cost you a cent. You can reach one of these Engineers at your local Standard Oil (Indiana) office or by writing 910 S. Michigan Avenue, Chicago, Illinois.

Copr. 1939, Standard Oil Co. (Ind.)

ACME CUTTING OIL

FIRST IN SERVICE FOR FIFTY YEARS STANDARD OIL (IND.)

STANDARD OIL COMPANY
(INDIANA)

LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRI

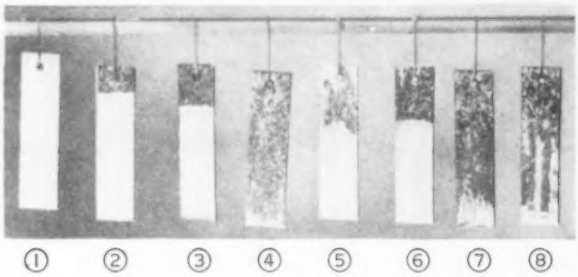
Anti-friction bearing on mounting supporting the main cylinder shaft in a combine. These bearings are lubricated and protected against rusting in storage with Stanorust.

STANORUST

Only after rigid tests under laboratory control was Stanorust given the job of protecting the anti-friction bearings in the harvesters manufactured by a large manufacturer.

When this problem of rust prevention came up, a Standard Lubrication Engineer was asked to give his recommendation. He picked Stanorust because it would give adequate rust protection and supply the necessary lubrication.

Because of the importance of having complete rust protection, the Chief Chemist at the plant decided to test a number of oils. Samples of polished steel plates were coated with various rust preventives and subjected to a mist spray of water for one week. The results of this test are shown in the illustration above. Stanorust gave complete protection even under this severe test where many of the other products failed completely.



Polished steel strips used in testing rust preventives at the customer's plant. No. 1 shows a sample strip before testing. Nos. 2 and 3 were protected with Stanorust and subjected to the test. Note the absence of rusting where Stanorust was applied in contrast to the various degrees of rusting in evidence on the other pieces not protected with Stanorust.

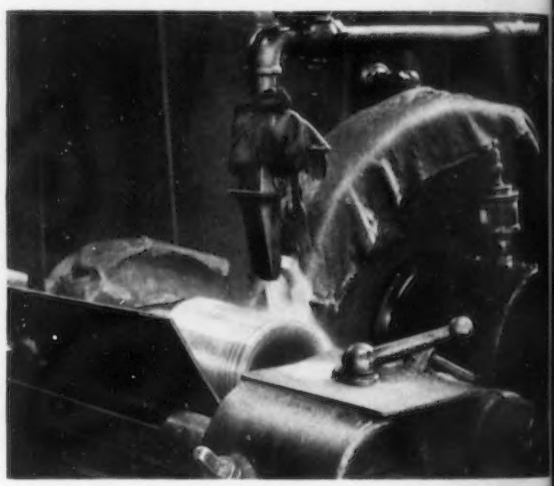
Stanorust is available in several grades. A Standard Lubrication Engineer will help you choose the right grade for your purpose and make a test in your shop. You can reach one of these Engineers at your local Standard Oil (Ind.) office, or by writing 910 S. Michigan Ave., Chicago.

YOU CAN GET THE SAME SERVICE THAT MADE MONEY FOR THESE MEN...

SUPERLA SOLUBLE OIL

Ten per cent longer wheel life and complete freedom from rusting of work! Those are two of the reasons an Indiana manufacturer gives for using Superla Soluble Oil exclusively in his shop for the past ten years.

He has tested many soluble oils in that time. None has met all of the requirements for all types of grinding as completely as Superla. Besides giving better tool life and freedom from rusting, even in lean mixtures, Superla Soluble Oil produces a fine finish. It's economical, too—it takes less oil to form highly efficient emulsions even in the



hardest water. Odor troubles caused by rancidity are entirely eliminated in Superla emulsions.

If you have a metal working operation on which a soluble oil can be used, ask for a test of Superla. A Standard Lubrication Engineer will be glad to show you how Superla meets all these requirements.

MAIL THE COUPON FOR LUBRICATION INFORMATION

STANDARD OIL COMPANY (Indiana) SEPTEMBER
910 South Michigan Avenue, Chicago, Illinois. Room 1223

Gentlemen: Please send me the booklets checked:

☐ How to Get More From Cutting Oils.
☐ How to Get More From Emulsifying Oils.

(Available to readers in the Middle West)

Name _____

Company _____

Address _____

City _____ *State* _____

• IF YOU USE cutting oils or soluble oils, you'll want these two NEW booklets. They tell what qualities to look for in these oils and describe how they affect tool life, finish and production on various metal cutting and grinding operations. If your plant is located in one of the 13 states shown above, these booklets will be sent to you without any obligation. Just send the coupon.

LUBRICATION ENGINEERING • • LUBRICATION ENGINEERING • • LUBRICATION ENGINEERING • • LUBRICATION ENGINEE

THE TIE THAT BINDS US TO COMFORTABLE OLD FRIENDS IS STEEL!

Everyone has a favorite pair of really comfortable shoes --- worn until the leather is thoroughly pliable, the shoes wholly comfortable. Ever stop to think that steel makes that possible? The average pair of shoes has 94 pieces of steel---which hold the shoe together, give it long life, make the modern shoe comfortable-- --in fact make it possible.

Almost everything in life today depends on steel--the clothes we wear, our transportation, the buildings we work in, the appliances that make modern life easier are of steel or made by steel machinery.

Not, of course, just any steel. The nails in your shoes are one type of steel, the tin-plated steel for packaging food is another, the sheet for your automobile body is a third. Youngstown maintains a great research department to make certain that on every order you place with us you will get the steel which will meet your requirements, and will help you produce a better product, at more profit to you.

QUALITY TRADE MARK YOUNGSTOWN SERVICE

★

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

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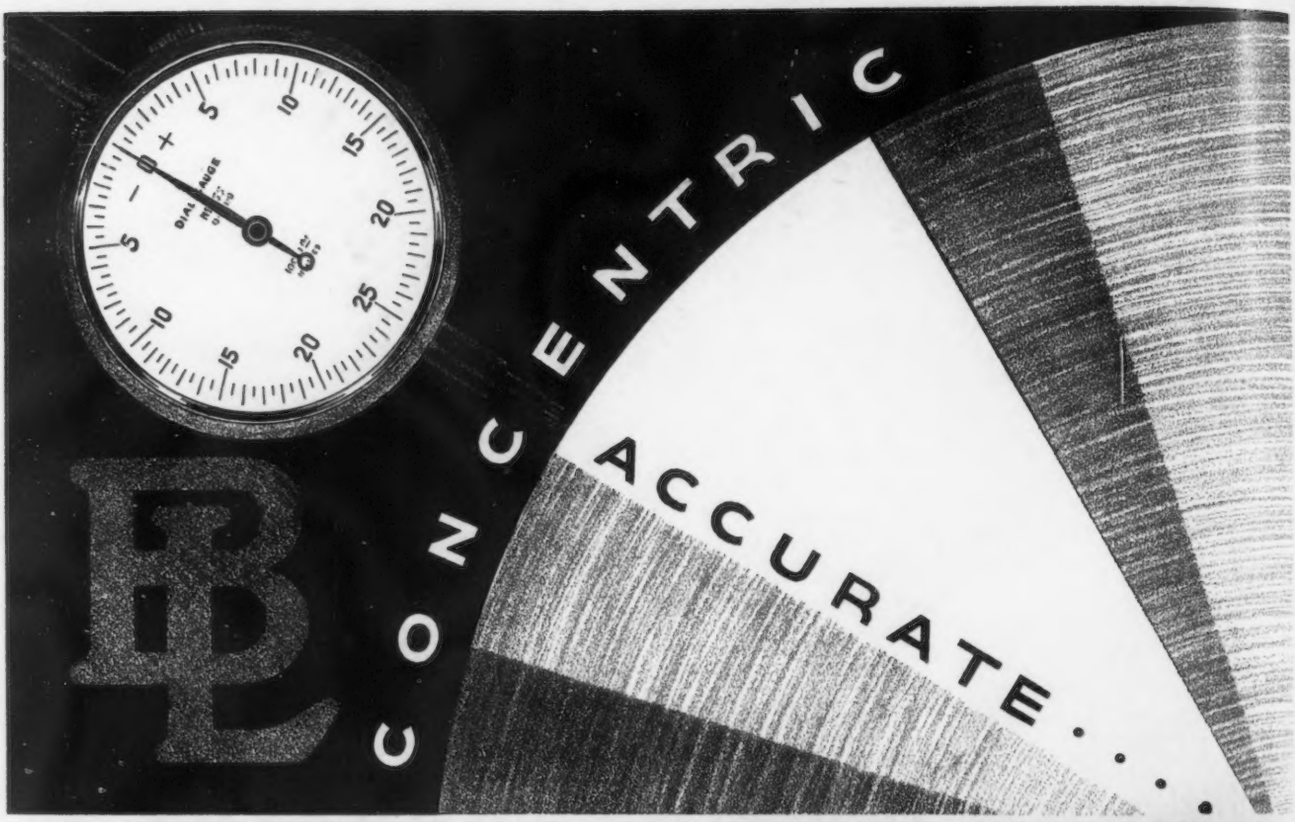
and Spikes

25-15B



Quality . . . COLD FINISHED SHAFTING

Wheels must turn faster—and shafting run smoother—to speed up this year's rate of production, and cut down next year's machine depreciation. Industry voices approval of B & L Cold Finished Shafting in terms of ever-increasing tonnages. Its use is justified in quieter running machines, longer lived bearings and reduced friction, vibration, and wear. Extremely close tolerances are met by the most advanced methods of cold working, straightening, grinding and polishing—and maintained by scrupulous care in testing and inspection

The extra quality built into B & L Cold Finished Shafting means extra economies for manufacturers using it.

COLD DRAWN
TURNED AND POLISHED
DRAWN, GROUND, POLISHED
TURNED, GROUND AND POLISHED

Let B & L engineers solve your shafting problems.

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* BUFFALO, N.Y.

COLD DRAWN BARS • GROUND SHAFTING • LEADED STEELS • SCREW STOCK • EXTRA WIDE FLATS • ALLOY STEELS

Threading Cost Reduced 80%

A typical example of the savings which may be effected by the use of modern production methods is that of threading valve seat rings

These seat rings, 7 5/8" in diameter, are made from stainless steel forgings of 280-320 Brinell hardness. The thread is 12 Pitch U.S.F., 7/8" long. The 32 EX Landmatic Head —the hand opening type—is used to thread these seat rings at a cost of 1 1/4 cents each. By a previous method the threading cost was 8 1/2 cents each — thus, a reduction of 80% is effected.

FOR PROFITS
MACHINE
TOOL SHOW

CLEVELAND
OCT. 4 to 13, 1939

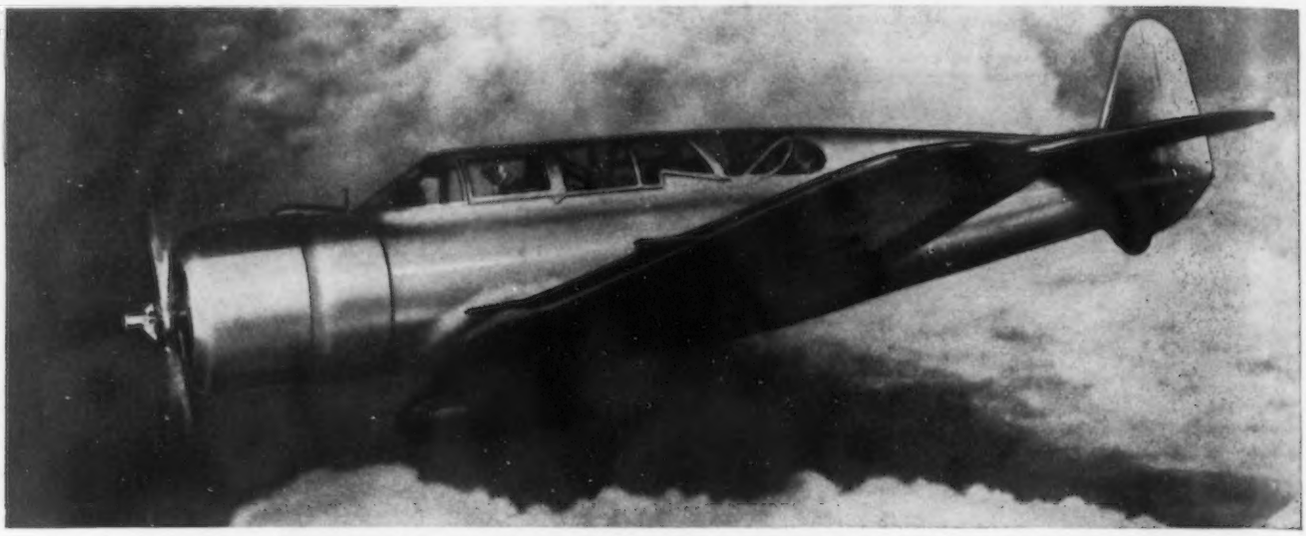
Booth No. 5114

LANDISize your Threads—Write for Bulletin No. F-90 today, covering LANDMATIC Heads.

LANDIS MACHINE CO., Inc.
WAYNESBORO, PENNA.

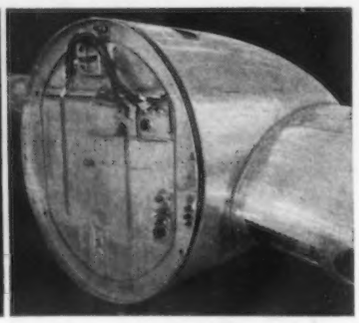
LANDIS

How STAINLESS STEEL helps make Aircraft Lighter, Stronger, Safer



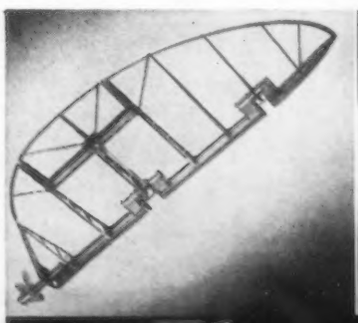
This Vultee V-12 attack bomber uses stainless steel for exhaust manifolds and fire walls to resist heat and corrosion and for military applications where lightness, corrosion-resistance, and abrasion-resistance are essential.

Above: Latest Piper "Cubs" use lightweight, corrosion-resistant stainless steel gasoline tanks.

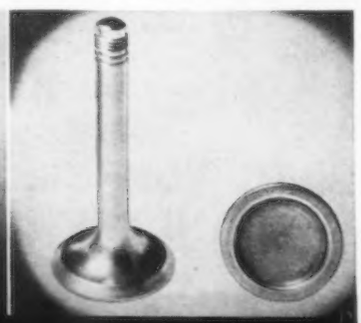


Above: This 18-8 stainless steel fire wall for use on the Douglas DC-4 is fireproof and immune to corrosion.

Below: A light, strong elevator frame for a Seversky P-35 fabricated from stainless steel by high-speed spot-welding.



Below: Stainless steel sodium-cooled exhaust valves, faced with Haynes Stellite alloy, after operating 714,000 air miles.



Electromet
Trade Mark
Ferro-Alloys & Metals

DESIGNERS and manufacturers of all types of aircraft find stainless steel an ideal material for an increasing number of uses. A few typical applications are shown here. Stainless steel has four inherent advantages which make it a logical material for use in aircraft construction:

1. **Excellent Strength-Weight Ratio** — Compares favorably with other commonly used materials. *Result:* Strength with light weight . . . more pay load . . . longer cruising range.
2. **Ease of Fabrication** — by modern, high-speed welding processes. *Result:* Faster production . . . cheaper production. Smoother surfaces . . . less drag . . . higher speeds.
3. **Corrosion Resistance** — immune to atmospheric corrosion. *Result:* No painting . . . faster production . . . less maintenance.
4. **Strength at High Temperatures** — up to 1650 deg. F. *Result:* Resists hot, corrosive gases and abrasion . . . longer life . . . dependability. Fireproof . . . greater safety.

We do not make steel, but for over thirty years we have produced "Electromet" ferro-alloys used in making steel. The fund of data on stainless and other alloy steels thus accumulated and the assistance of our metallurgists are available without obligation. A request on your letterhead will bring the book, "Stainless Steel in Aircraft."

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.
The word "Electromet" is a registered trade-mark of Electro Metallurgical Company.

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Member, Audit Bureau of Circulations
Member Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

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THE IRON AGE

Contents

SEPTEMBER 14, 1939

More, More, More!	11
A Hundred Slaves for Each American	51
Flame Gouging for Grooving Steel	53
Heavy Duty Boring Lathes for Export	58
Steel Standardization	61
Improving Flexibility of Welding Fixtures	67
A New Principle in Tool and Die Milling	68
Machine Tool Developments Proceed Apace	71
On the Assembly Line	78
Washington News	82
THE NEWS IN BRIEF	98
Statistics on Metal-Working Activity	102
Weekly Ingot Operating Rates	103
Rate of Activity in Capital Goods	103
Plant Expansion and Equipment Buying	120

▼ ▼ ▼

Just Between Us Two	131
Products Advertised	132
Index to Advertisers	156

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... THE IRON AGE ...

SEPTEMBER 14, 1939

ESTABLISHED 1855

Vol. 144, No. 11

A Hundred Slaves for Each American

ALADDIN, of the Arabian Nights, possessed through his magical lamp the power to summon a slave to carry out his commands. The average American of today, however, according to Dr. Robert A. Millikan, commands a hundred slaves in the form of power machines.

Says this eminent physicist:

"In this country there is now expended about 13.5 hp-hr. per day per capita—the equivalent of 100 human slaves for each of us; in England the figure is 6.7, in Germany 6.0, in France 4.5, in Japan 1.8, in Russia 0.9, in China 0.5. In the last analysis this use of power is why our most important social changes come about.

"This is why we no longer drive our ships with human slaves chained to the oars as did the Romans and the Greeks.

"This is why we no longer enslave whole peoples, as did the Pharaohs, for building our public structures and lash them to their tasks.

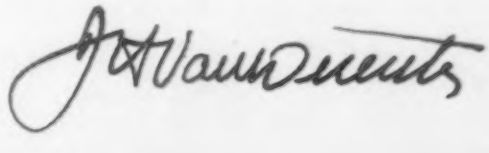
"This is why 10 times as many boys and girls are in the high school today in the United States as were there in 1890—more than five million now, half a million then.

"This is why we have now an 8-hr. day instead of, as then, a 10, a 12 or sometimes a 14-hr. day.

"This is why we have on the average an automobile for every family in the country.

"This is why the lowest class of male labor, i.e., unskilled labor, gets nearly twice as much in real wages in the United States as in England, three times as much as in Germany or France, and 13 times as much as in Russia."

Dr. Millikan has no "axe to grind" for the American System of Enterprise. He is not interested in the profit motive. His view of mechanization is a detached one. That it coincides with ours is gratifying to us and significant as an unbiased and effective endorsement of invention, improvement and mechanical progress.



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WAR'S Effect on Industry

OUTBREAK of hostilities in Europe brings rapid acceleration of American industrial activity . . . Export and domestic markets expand in steel, non-ferrous metals, machine tools, etc. . . . Shipping a problem both for exports and essential imports . . . Steel industry in position to cope with greatly increased demand without serious bottlenecks.

WITH the European war less than two weeks old, one of the quickest changes in business activity that American industry has ever experienced has been witnessed. Immediately following the outbreak of the World War in 1914 there was industrial and financial prostration, from which the country did not begin to recover until the early part of 1915. Profiting by their experience in the World War, which demonstrated that a large foreign demand for materials, equipment and supplies would soon flow to a nation with the industrial resources of the United States, business people were quick to sense that a period of rising demand at home and abroad might lead to shortages and slower deliveries, accompanied by rising costs and prices. Thus, with almost unanimous action, buyers came into the market immediately after Great Britain and France had declared war in an effort to protect themselves against whatever might happen, the result being an almost unprecedented rise in activity in all of the branches of industry in which readers of THE IRON AGE are particularly concerned.

Export markets were almost the first to be stimulated. As war was declared by Great Britain and France on Sunday, Sept. 3, the first business day in the United States was Tuesday, Sept. 4, but as Labor Day is not observed abroad, a flood of cablegrams from all parts of the world came to the United States on the holiday, which to many exporters was a regular business day. In fact, the war on Poland, which began Sept. 1, was the signal for a sharp change in the export situation.

In the eight or nine business days that have elapsed since a European war became an actuality the demand from abroad for American steel, non-ferrous metals and machinery has been tremendous. In steel, the number of inquiries has far outrun the number of orders up to this time. The fact that all inquiries have not immediately been translated into business is due primarily to the shipping situation, which for some days after the outbreak of war was in utter confusion, from which some semblance of order is now emerging. Despite the difficulties, however, of arranging for ocean shipments, a considerable volume of export business in steel, machinery and other products has been done.

Further acceleration of industrial activity will result if, as many well-informed people believe, the Neutrality Act is repealed at the special session of Congress to be called by President Roosevelt. The cash-and-carry provision which was suggested in Congress, but which was not incorporated in the act as passed, is virtually being carried out by American shippers under present conditions. Sales are being made almost exclusively in American currency against firm letters of credit and steamship companies are also demanding spot cash for freight charges.

Inventories Being Expanded

Domestic steel business has been greatly stimulated by fears on the part of buyers that prices may be higher and deliveries slower. Nearly all users of steel have been running their inventories on a hand-to-mouth basis and all at once almost everybody decided that the present situation dictated a reasonable increase in stocks, with the result that domestic steel orders have greatly expanded. As in all such situations, there has been a tendency among middlemen and some consumers to speculate by ordering more than their normal requirements, but steel companies are proceeding carefully in an effort to thwart any movement that might lead to a runaway market. Pending the announcement of prices for the fourth quarter, steel companies have been restricting orders and specifications to quantities that can be rolled and shipped this month. It may be that some deliveries will extend into October because of the inability of the mills to get them out sooner, but orders which have specifically requested October shipment have been declined in many instances except at the prices ruling at time of shipment. A factor which has added to steel orders is the insistence of the mills on full specifications against low-priced commitments for sheets and strip in order that books may be cleared of such tonnage before costs rise.

There is patently a disposition among steel producers to avoid any action which may tend to boost prices unnecessarily. Over

some items of cost, such as scrap, ferromanganese, tin, zinc, etc., the steel companies will have no control in the present situation, but the intention to adhere to a conservative pricing policy is indicated by the extension of the current price of $5 per base box on tin plate into the fourth quarter despite the fact that tin prices have already gone much higher. However, it seems that all prices will be on virtually a 30-day basis, rather than quarterly, until the outlook can be more clearly appraised.

Steel Export Prices Advanced

Steel prices for export have, however, advanced sharply, but they were in most instances well below domestic prices and also below costs. The new prices are in line with domestic quotations. For example, semi-finished steel, which was recently being sold at $30 a gross ton, f.a.s., is now quoted at $35 to $36. Some of the mills in the interior are not quoting f.a.s. prices on finished products, their quotations reading f.o.b. mill with freight allowed to seaport On this basis, plates have been sold at 2.50c. a lb., seaboard, although some of the Eastern mills have not gone above 2.10c., mill. Quotations cabled abroad are frequently subject to acceptance within 72 hr. Some steel export departments are insisting that the buyer arrange for shipping space, while others will arrange for the space on buyer's account.

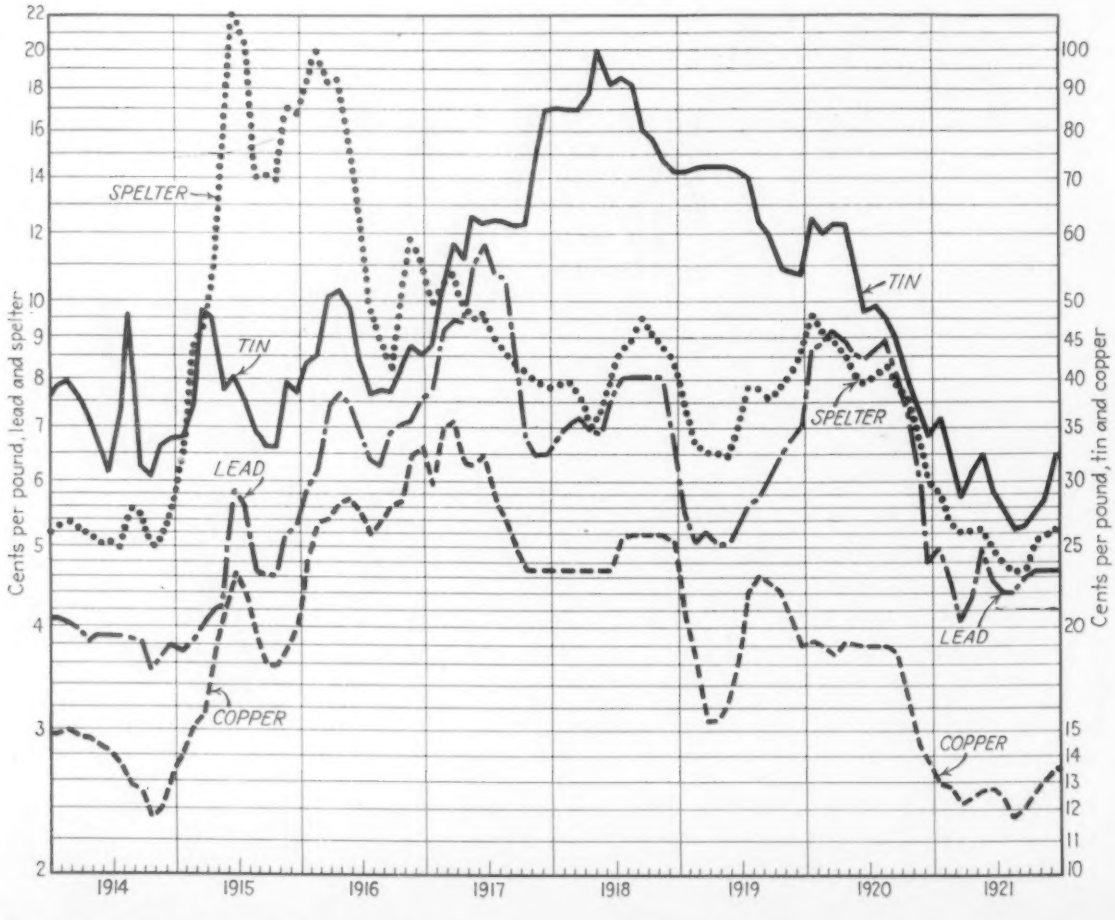
Increased costs of operating shipping lines as a result of the war—in which nearly a score of merchant ships have already been sunk by submarines or other naval craft—have already been reflected in higher freight rates and insurance rates, which are likely to vary as conditions change. The North Atlantic-United Kingdom Conference and the Pacific Coast-European Conference have raised contract rates 33 1/3 per cent to the United Kingdom and Continental ports and 50 per cent to Mediterranean ports and to Norway and Denmark. The North Atlantic-Far East Conference has raised rates 20 per cent. Marine insurance costs are unpredictable, varying as they do according to the port of destination, the flag which the ship flies and other conditions.

Great Britain has announced that a convoy system for her ships will soon be in effect. It is expected that within the next several weeks orders for several hundred thousand tons of steel for Britain will be placed in the United States.

Good Supply of American Ships

No serious shortage of bottoms to carry American exports is anticipated. American shipping lines, both private and Government operated, plan to proceed with operations. Although increased demand for space will place a premium on ships, it is also true that American shipping tonnage will be increased by new ships and by reconditioned ships. Some of the latter are now obsolete and obviously cannot be operated efficiently, but they can be put in shape for use if necessary. There has long been a surplus of both Government and private ships. Approximately 400 American ships are now in commission, and it is estimated that they carry almost one-third of the country's export trade. The Government now has under construction 50 to 60 modern cargo vessels, some of which are now coming off the ways and work on others can be expedited if necessary. Shipbuilding is one of the industries, already quite busy, which is due to boom under war conditions.

In addition to the steel, machine tool and non-ferrous metal industries, which have already been greatly stimulated by the war, other lines vital to the metal-working industries are expected to gather increasing momentum. The automobile industry, just fairly getting started on production of 1940 models, would have been a good customer of the steel mills this fall in any case, but with a war its output of trucks probably will be increased. While some foreign markets for passenger cars



THE trend of non-ferrous prices was sharply upward in the World War period, though the major advance did not begin until 1915.

and trucks will be temporarily lost, there will undoubtedly be a demand, particularly for trucks, from Great Britain and France and also from neutral nations which can no longer be supplied from Europe.

The railroads will feel the benefit of greater carloadings, which, in turn, will bring some of them into the market for new equipment and will hasten repairs of old equipment. Additions to cars to be made by the Chesapeake & Ohio, Norfolk & Western and the Virginian are said to be in anticipation of a larger coal movement for export. The steel industry, and makers of cars and locomotives and other railroad equipment see a possibility of heavy buying by the carriers if carloadings increase sufficiently.

Railroads May Need Equipment

Twenty-two hundred locomotives and 300,000 freight cars (the cars alone would require approximately 3,000,000 tons of

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STEEL products and scrap had sharp price rises in the World War period, which delayed until the war had been in progress for many months.

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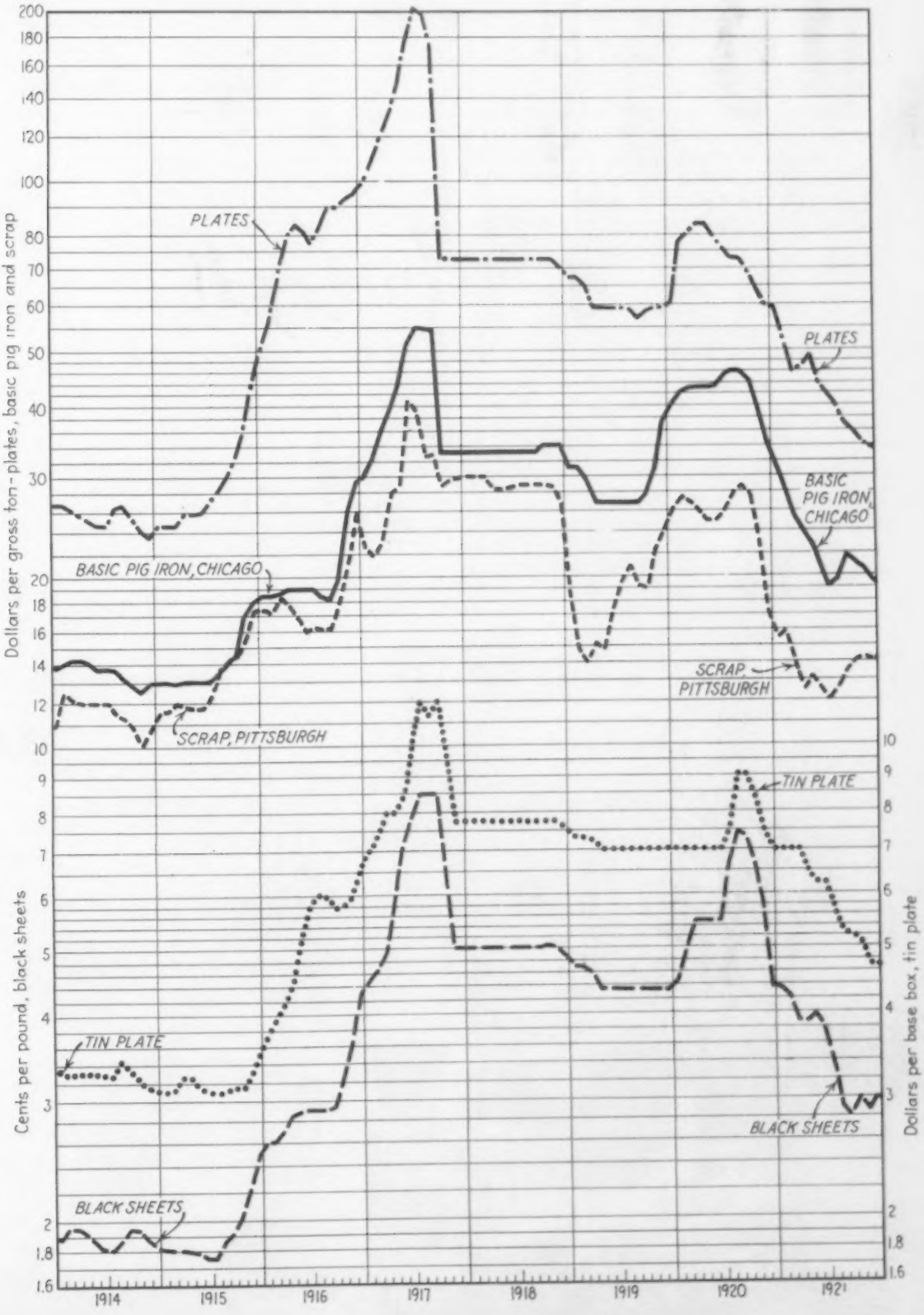


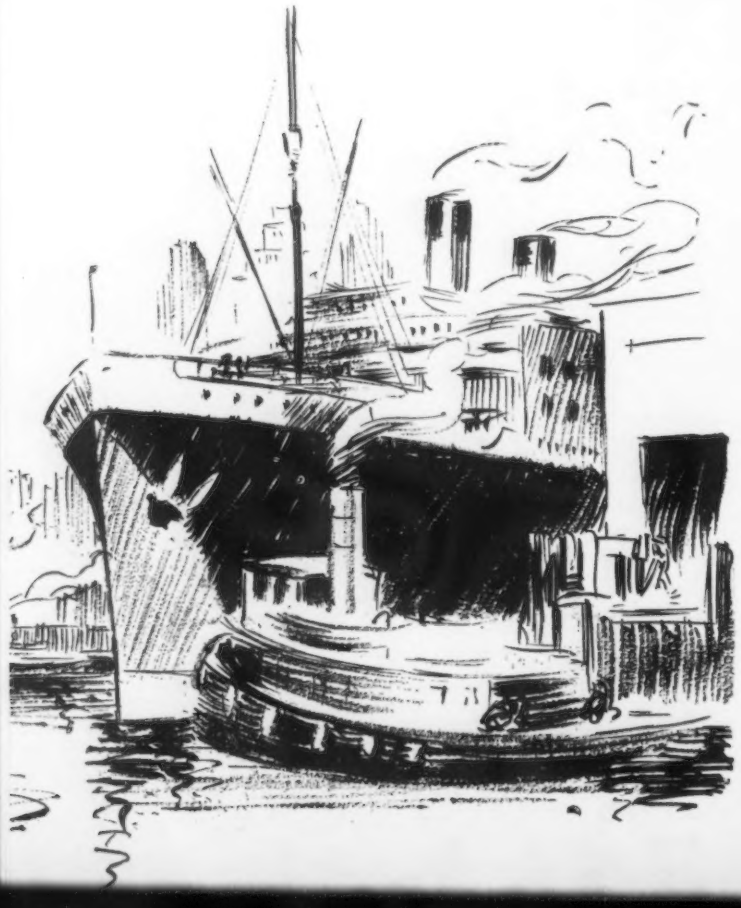
steel) will be needed by American railroads to give these carriers the capacity to handle the volume of traffic which the first World War developed, *Railway Age* said last week in a survey which indicates that the railroads are not ready for war even if the United States stays neutral.

However, J. J. Pelley, president of the Association of American Railroads, said that "the railroads can handle at least 25 per cent more traffic than they are now handling, and by repairing approximately 200,000 freight cars and 8000 locomotives now awaiting repairs, and not required for present traffic, they could handle 45 per cent more business." If and as additional equipment is required it can be had, Mr. Pelley said, and the railroads can and will keep ahead of any demands that may be made upon them.

"These conclusions," the railroad association president said, "are the result of a very careful study made several months ago. It is a fact that there has been a great reduction in the amount of equipment owned. It is also a fact that there has been a great increase in the efficiency of movement. For example, the average speed of freight trains between terminals is now 61 per cent greater than in 1920 and the tons handled per train-hour, which is the real measure of work, have increased 106 per cent since 1920. It is conservatively estimated that the traffic of 1929, the largest in history, could now be handled efficiently with from 350,000 to 400,000 cars less than were owned at that time."

A much darker picture of the railroads' ability to meet heavy demands on rolling stock is painted by *Railway Age,* which finds that "from the standpoint of car supply, the railways are in no position to handle any such increase in traffic as that which occurred between 1914 and 1916." This publication adds:

"In 1914 the railroads had 88,000,000 tons of freight car capacity and in 1938 only 83,000,000 tons—6 per cent less. Moreover, in the decade ended with 1914 the freight car inventory was a much newer inventory than that on hand today. The total new freight cars acquired in the past 10 years is less than 27 per cent of the present inventory, whereas the cars purchased in the decade ended 1914 totaled 78 per cent of the total cars in service at the end of that year.



Many Locomotives Antiquated

"Thus we face a situation similar (but more serious) as to traffic prospects to that which confronted the railroads in 1914—and we go into this period with a depleted car supply and one much older on the average than that which the railroads had in 1914. The antiquity of the present locomotive inventory—as a measure of the railways' inability to meet the demands of a war crisis—is even more serious than that of their freight car equipment. In the decade ended with 1914 total acquisition of new power was 57 per cent of the entire inventory of locomotives on hand at the end of that period, whereas in the past ten years the total of new locomotives acquired has been only about 10 per cent of the present locomotive inventory.

"The American railroads would have to replace about 20,000 of their existing locomotives and more than 900,000 of their freight cars with new ones if their inventories were to be restored to the age condition which existed when they entered the war period of 1914-18."

Records of the American Railway Car Institute show that the peak year for freight car production since the outbreak of the first World War was 175,748 units in 1923. In 1924 and 1925 the totals of cars built also passed the 100,000 mark. The low point of the last 25 years was 1933 when only 2163 cars were built and the second poorest year in that period was 1932 with 3254 units.

During the last World War the volume of freight cars built in 1916, was 111,516, or almost double the total of 58,226 in 1915 while in 1917, when the United States entered the war on the side of the Allies, the number of freight cars built was 115,705. In 1937 the car total was 77,498, a figure well below the average of 90,591 built yearly since 1889.

Few Bottlenecks in Steel Industry

With the iron and steel industry facing a tremendous upsurge in demand, a survey of the steel mill equipment situation within the past few days discloses a minimum of bottlenecks in the production cycle.

With equipment orders of some types already rolling in, the most active lines are expected to be those serving blast furnaces and steel finishing mill auxiliary needs.

The steel industry finds its equipment from the open-hearth down to the rolling mill in excellent shape, capable of taking care of almost any demand placed upon it. In the blast furnace field, however, idle furnaces have been neglected to some extent.

Mills have taken their time in making much needed repairs on the blast furnace proper and its auxiliary equipment. The abrupt rise in ingot output, which this week made a new high for the year and the highest rate since 1937, finds most large integrated steel makers with serious problems involving relining of blast furnaces, stoves, and replacement of worn out auxiliary equipment.

The certainty of further substantial increase in raw steel output in this country indicates that most of the idle blast furnaces capable of being put into commission in short order, will be blown in as rapidly as possible.

Supplies of refractory brick in the hands of most steel companies are at an abornmally low point, hence a rush for this type of raw material is already under way. Inquiries being received by equipment firms supplying blast furnace auxiliary equipment have skyrocketed in the past few days. Even com-

(CONTINUED ON PAGE 100)

WAR and Machine Tools

OUTBREAK of war brings strong upsurge in orders for machine tools, with Canada the principal foreign buyer . . . Orders being shifted from Germany by some countries . . . Domestic demand has also increased, partly in fear of delayed deliveries . . . Machine Tool Show cancelled.

A STRONG upsurge in machine tool demand started Tuesday, Sept. 5, following declaration of hostilities abroad over the holiday week end. Both foreign and domestic demand showed an immediate increase. Canada led the foreign parade of buyers. Canadian manufacturers are in the market for any machinery they can lay their hands on—either new or used equipment. France and England are increasing their recent business, the Japanese are shifting orders from Germany, second largest source of machine tools in 1938, to the United States, largest supplier last year. In fact, a Japanese agent is already negotiating the purchase of machinery for a Manchukuo truck plant, originally to be bought in Germany. Russia has not increased its purchases, but is proceeding with plans already initiated before war was declared. Recent dispatches from Moscow indicate that the U.S.S.R. has been piqued by the cancellation of orders for lathes and presses given to English makers this past summer. Much of this business is expected to come to America eventually.

Russia, through the Amtorg Trading Corp., is pressing for earlier delivery on machines ordered in the recent past. In some instances, new domestic business has been given preference and delivery promises have been extended rather than shortened. Russia's problem, like that of every other foreign nation, is also one of shipment. With Italy still on the fence, shipments will undoubtedly be routed through the Mediterranean and Black seas to Odessa, instead of through the Baltic to Leningrad. In the past, during the winter months, Russian cargoes have been transshipped by rail from Hamburg when the latter port was icebound, but this practice will not be available this winter.

Foreign demand all this year has been the heaviest encountered in the history of the industry and has averaged 52 per cent of the total volume. Following a peak in March, the domestic side receded slowly up to Sept. 1, the summer months of June, July and August being particularly light.

New obstacles have been placed in the way of foreign business. Difficulty in obtaining vessels for shipments abroad has added to the burden. With the closing of the Baltic, deliveries to the Scandinavian nations have been affected as well as to Russia. In fact, chartering of vessels to any port is exceedingly difficult. Another hindrance at the present moment has been the delay in communications. Unless the country has buying agencies already established in the United States, contact with foreign agencies has been lost for the moment. Cables abroad are not being answered in many instances and mail has been greatly delayed and hampered. Mobilization in France and England has also broken up long established contacts. Hence the full effects on foreign ordering have yet to be felt, when trade intercourse is more firmly reestablished.

Domestic Orders Gain Sharply

The domestic market has picked up rapidly due to a variety of secondary causes. Deliveries have been lengthening steadily during the summer and local manufacturers are now anxious to cover their immediate needs for equipment. As raw materials prices immediately rose, a price advance is being anticipated in finished machinery. Then, too, many commitments were being withheld until the Machine Tool Show. Cancellation of the show obviated the need of waiting longer. In fact, some firms, like aircraft engine manufacturers which wanted machines in a hurry, were able to get almost immediate delivery on machines intended to be exhibited at Cleveland.

It seems apparent from renewed activity in this direction that the aircraft engine and part suppliers are going ahead on the assumption that the Neutrality Act will be repealed within a month. At any rate, both the British and the French have taken advantage of their option to double their original order of 1400 planes, even though the present law prohibits the shipment of such planes and engines. The equipment will be built and stored in the meantime. In line with the same kind of reasoning, some firms now engaged in general industrial lines are buying machinery on the gamble that it will soon be permissible to manufacture and ship munitions abroad.

"You can point your finger in almost any direction today and

find demand coming from there," said a leading Cleveland producer. "We are endeavoring to cooperate with American machine tool users to the fullest extent and have even started to conduct a survey of this nation's immediate needs." Cincinnati builders report that domestic demand has definitely broadened until it is about equal to the present foreign ordering. Domestic demand is coming from all sorts of users, including railroads, munition manufacturers, automobile concerns, Government plants, and, in fact, virtually from the whole machine tool using industry.

Machine tool plants in Rockford all are comfortably busy. No great flurries of orders, either foreign or domestic, were noticeable there last week, however. All Rockford builders have considerable foreign business on hand ranging from around 40 per cent to well above 50 per cent of total bookings. Some of this is for ordnance and aircraft manufacture abroad, but the larger proportion is destined for more pacific purposes. Domestic orders increased somewhat after the outbreak of the war overseas, but most of this was work that had been pending for some time. Rockford deliveries today range from eight to 10 weeks on standard tools, to well into the first quarter of 1940 on such equipment as drills and honing machines.

Small Companies Buying

On the domestic side a notable increase in demand from small companies started. Propositions dormant for as long as two or three years were revived speedily. In part at least the decision of large companies to "farm out" some of their parts production, due to the sudden strain, was responsible for the small companies coming into the market. A number of large companies indicated that at this time they could not see their way clear to undertake expansion to meet the demand and in any event preferred to hold back until they saw whether there would be a reaction. On all sides it was pointed out that the business situation following outbreak of hostilities in Europe was entirely different than in 1914. In 1917, as many will recall, the machine tool industry reached its all-time peak of shipments. By 1919 it was employing around 53,000 persons, a record figure.

Press manufacturers, particularly, encountered strong demand from domestic manufacturers of small parts, most of whom did not even wait for quotations before ordering. "The numerical volume of machines we have sold in the last two weeks has been greatly in excess of any similar period for many years," said the representative of a Cleveland press manufacturing company. "From 8 o'clock this morning until 3 o'clock this afternoon we sold 32 new presses out of stock in lots of two, three or five and in the $400 to $3000 class. Small manufacturers seem to have the money to buy equipment."

A few specific examples of individual company reports indicate how the market has reacted in some instances. From Sept. 5 to the close of business on Sept. 8, one machine tool plant which already held a comfortable order backlog sold an additional 60-days' production. Another company revealed as the show was cancelled that the eight machines intended for its display had been sold in one lot for shipment to Canada. This same manufacturer received numerous other sizable orders of $100,000 or more each. A large maker of milling machines in the Chicago district is the only one of several machine tool builders canvassed to report conditions resembling a war boom. This plant, which has been operating three shifts daily all year, has received since last Tuesday orders from England, France, Australia and Sweden, to name only the most important, the first two countries being not so active at the moment. Deliveries are well into 1940, but this also was the case before the start of the European war. On top of this foreign demand, August at this particular plant was the best month for domestic orders since 1937. To date no difficulty in obtaining foreign shipping accommodations has been experienced by this company.

Although Chicago sales agencies have not yet received many orders that could be attributed to concern over the war and its effects, they are expecting within the next week or two considerable business driven in by fear of higher prices and extended deliveries. One Chicago sales agency, however, received orders in the first week in September equal to all of August business, but none was considered out of the ordinary. New York dealers, on the other hand, reported a noticeable increase in all types of domestic ordering last week, although Government business and aircraft engine and parts manufacturers continue to hold the limelight.

Deliveries Getting Longer

Delivery promises on milling machines and lathes are being extended and it is almost impossible to establish a consensus of promises. Deliveries on certain types of screw

(CONTINUED ON PAGE 122)

National Machine Tool Builders Show Postponed Indefinitely

BECAUSE of the war in Europe, the National Machine Tool Builders Association has postponed to an indefinite date the Machine Tool Show which was to have been held Oct. 4-13 at Cleveland.

Also postponed is the Machine Tool Congress, a series of meetings which were sponsored by a group of nine engineering and technical societies and which were to be held during the Machine Tool Show.

"Members of the association feel that the greatest contribution the industry can make to the welfare of the nation at this time is to concentrate their entire efforts on the production of the greatest possible number of machine tools," Wendell E. Whipp, president of the association, said.

"Under the circumstances the industry and its customers cannot afford the time of its key men for a machine tool show, and postponement is felt to be the wisest course."

The postponed show, in which more than 200 exhibitors were to have demonstrated approximately 1000 machine tools, most of them in actual operation, was to have been the fifth such exhibit. The last show, held in the fall of 1935 in Cleveland's large Public Auditorium, drew more than 50,000 visitors.

"Immediate effect of the war is a quickened demand for all of the products of industry," Mr. Whipp said. "While everyone is conscious of the demand for munitions, the embargo will eliminate that factor in the present situation. However, it has been estimated that munitions were only ten per cent of our exports during the last World War, and the greatest burden by far that will fall on American industry is to furnish the normal needs of nations who have been trading with the countries now at war and who can no longer be served by them.

"This great demand for goods of all kinds is reflected in the need for better machine tools, since all manufacturing equipment is built on them."

IF WAR Brings Price Control to Steel

EXPERIENCE gained in World War, together with recent studies made by Federal Trade Commission and Department of Justice, will form basis for next price control if war comes to the United States . . . Lower quotations than in previous war seem probable.

WASHINGTON—Whatever may be done respecting peace-time control of prices, it is clear that the War Resources Board will be prepared to fix levels immediately if the United States should become involved in war. That it is moving with speed toward a plan of control was indicated last week when it engaged economists from the Departments of Labor and Agriculture and the Federal Reserve Board to watch commodity price trends under war conditions as a precautionary step against excessive price increases.

As a pattern for its studies the board will have the indexes of the Department of Labor, which showed a marked increase in commodity prices from 1914, when the former European war broke out, to June, 1920. Price averages for the 1923-25 period are given the index of 100. During the 1914-June, 1920, period the index to the cost of goods purchased by wage earners rose from 58.9 per cent in December, 1914, to 121.2 per cent in June, 1920. Costs of production, including sharp rises in labor rates, also mounted. The average composite price of pig iron during the 1923-25 period was $22.59 a gross ton compared with the present-day average of $19.61, while the average composite price of finished steel was $50.24 per net ton as compared with the existing average of $44.72. The average price of No. 1 heavy melting scrap during the three-year period was $17.77 a gross ton as against the average of $15.62 reached last week.

Just what prices would be fixed for pig iron, steel and scrap in the event this country became engaged in war manifestly is not known, but it is probable that the WRB already has data at hand on which it could quickly base levels. Unlike the War Industries Board it would not have to await extensive study. But the work done for the WIB in determining prices is said to have been or is being brought up-to-date to be ready, in case of necessity, for quick application of price control. Comprehensive data on steel costs, production and distribution have been gathered by both the Federal Trade Commission and the Department of Justice in connection with the investigation of the industry by the Temporary National Economic Committee and it is considered highly probable that the material is or will be, if required, placed at the disposal of the WRB.

World War Experience Valuable

The World War experience undoubtedly offers an insight of what may be expected if war time price control again becomes necessary. President Wilson, early after the United States entered the World War, directed the Federal Trade Commission to ascertain the cost of production of steel products, as well as of the primary materials used in the manufacture of steel, together with related information, such as prices, profits, etc. The work was originally undertaken in compliance with oral directions from the President, which related specifically to steel plates and shapes, and later by general orders, in a letter dated July 25, 1917, which directed the FTC not only to ascertain the costs of steel, coal, and various other products, but also to do the cost finding work of the Government generally. Much concern was shown by Washington over the rapid rise in prices of steel and other war materials.

For a time consideration was given to the Government direct price-fixing power over steel, similar to that provided for coal, but it was found to be evident that the same results could be reached indirectly through various other Government powers, such as fuel control and, later transportation control. Nevertheless, it is reported that legislation for Government war-time control of industry is under contemplation. Finally the general plan adopted was to tabulate the costs for each product by companies and to summarize the costs in a table from the lowest to the highest, together with the percentage of output of each company and the cumulative percentage of output with the addition of each successive company. These cost summaries enabled the price-fixing committee of the WIB to see what the highest costs were for the tonnage which was deemed essential for the conduct of the war. Generally, as pointed out by the FTC in its 1925 report on "War-Time Profits and Costs of the Steel Industry," in the case of the more important steel

products, it was regarded as essential by the WIB to get full production. Since so much of the earnings of steel companies during 1917 and 1918 was taken from them by the Government in the form of income and excess profits taxes, as undoubtedly will be done again if there is war time control once more, it did not matter greatly what, within reason, profits were and the big thing was production. Nevertheless, the FTC implied strongly that it thought steel prices fixed by the WIB were too high.

FTC Favors Low Prices

The FTC indicates as much in its report wherein it disclaims responsibility for the prices fixed, "although a member of the commission was a member of the price-fixing committee of the War Industries Board." It may be a fair conclusion that if the FTC has a hand in future steel price-fixing it will press for lower levels than might be considered desirable by the industry at least, if not the WRB.

The commission's report explained that the essentiality of getting full production did not mean the price had to be fixed to cover the cost of the highest cost company, "because there are always likely to be some steel works where, from time to time, costs are higher than selling prices on account of abnormal conditions."

The cost summaries were supplemented by group summaries which did not show the individual companies but merely the number, tonnage, and percentage of tonnage at a maximum cost, by groups, cumulatively. There were four groups: Companies using chiefly their own output of iron ore and coke; companies beginning operations with the making of pig iron; companies beginning with the manufacture of steel; and companies beginning with the rolling of steel products. Thus the number of companies and their tonnage of a particular product which could be produced at or below the respective specified costs per ton would be shown for about 60 per cent, 70 per cent, 80 per cent, and 90 per cent of the total output reported, together with the actual minimum and maximum costs for all companies reported. This gave the information shown in the general summaries without disclosing the identity of individual companies.

Average costs were not usually computed for reports to the price-fixing committee of the WIB with respect to iron and steel products because, the FTC said, they had little or no direct bearing on the problem of fixing prices. They were held to be useful, however, for showing the more general conditions of cost and the trend of costs from one period to another. The cost reports received from the producing companies were sufficiently complete to enable the commission to show for most important products about 90 per cent of the total production of the country and in some cases practically all. These reports began in October, 1917, and were continued through the calendar year of 1918.

Earnings Rose Sharply in War

"The stimulating effect on American industry of the war in Europe began to manifest itself in the steel industry in the latter part of 1915, and became quite intense in 1916, while in the first half of 1917 prices advanced to unheard of heights," said the FTC. "Governmental efforts to check and reduce prices began about the middle of 1917, and iron and steel prices were definitely put under regulation in September of that year and continued under regulation after the armistice, and until the end of 1918. These developments are clearly reflected in the course of earnings which were only 7.4 per cent in 1915, but rose to an average of no less than 28.7 per cent on investment in 1917. The effect of Government price regulation is manifested in a substantial reduction of earnings in 1918, namely 20 per cent. In this connection it should be noted that the Government desired to maintain the fullest possible production of iron and steel, which doubtless tended to result in a rather liberal price-fixing policy.

"Furthermore, the heavy Federal taxation of income and excess profits was expected to insure that a large part of any profits made would be paid over to the Government. The average rate of earnings for 1915 and 1916 (that is, years before the United States entered the war), was 14.6 per cent, and for the two war years, 1917 and 1918, it was 24.1 per cent. For the four-year period, 1915 to 1918, the average rate of earnings, as reported by these companies, was 20 per cent."

Heavy Taxes on Earnings

That war does not pay is strikingly reflected in the commission's report showing that a considerable part of the earnings of the steel companies during 1917 and 1918 was taken by the Federal Government through income and excess profits taxes. Steel companies, excluding the United States Steel Corp., reported for 1918, on the average, as reserved for Federal taxes, an amount equal to 42.5 per cent of the net earnings, or 7.9 per cent of their aggregate investment. For the United States Steel Corp., Federal income and excess profits taxes amounted in 1918 to 55.7 per cent of its earnings in that year, or 11.8 per of its investment. The amounts reserved for Federal taxes were also large in 1917, but in 1915 and 1916, the commission said, were comparatively small. In addition to Federal taxes, the steel companies also had to pay high state and local taxes during the war years, reports on which were not made by the FTC.

The report shows also that labor efficiency declined in the war years of 1917 and 1918 as compared with earlier years.

"Possibly military service took away some of the most capable employees, while various other conditions doubtless militated against keeping up the rate of output," said the commission. "In years of greatly reduced tonnage—as might be expected—the number of employees was reduced (that is, 1908, 1914, and 1921), but the tonnage generally fell off more than the reduction in labor force, probably because it was important to maintain the organization in spite of bad times. This partly explains, perhaps, the low rates per man per annum in 1908 and 1921.

"The figures for average wages and salaries per ton of finished products are also a rough indication of the trend of cost changes for an important element of cost. While the labor item is generally not a large item of cost for individual steel products, as costs are ordinarily kept, the chief reason for this is that there are so many successive stages of manufacture for which the costs are set up that the element of wages is successively absorbed in the item of material used as progress is made from raw materials to pig iron, from pig iron to steel, from steel to semi-finished products, etc. In the aggregate the wages and salaries form a large element of the total manufacturing cost and general and selling expense, and for the Steel Corp. in 1923, for example, constituted about 35 per cent, as shown by the company's annual report."

FLAME GOUGING:

AN ECONOMICAL METHOD OF GROOVING STEEL—I

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THIS oxy-acetylene process, applicable to rolled, forged, and cast carbon steel of 0.35 per cent maximum carbon content, was developed originally for removing metal from the underside of welds and for removing weld defects revealed visually or by X-ray. It is now used for a variety of other operations, including the making of U-grooves in plate edges preparatory to welding. These applications, as well as the principles underlying the process, are outlined in this article, the second part of which, to appear in an early issue, describes the equipment and technique of flame gouging.

OXY-ACETYLENE welding and cutting have often been popularly termed "the hammer and saw of the metalworker." Now, with the advent of oxy-acetylene "gouging," the carpenter's chisel might well be included in this metaphor. For the gouging blowpipe is to metal fabrication, maintenance and repair what the chisel is to woodworking. In fact, the gouging process goes even further, for as compared with previous methods it is much more rapid and less expensive.

Originally gouging was developed for removing metal from the underside of welds and for removing weld defects revealed by visual or X-ray inspection—operations which normally involved a great deal of chipping with pneumatic hammers. The immediate success of the gouging blowpipe for this type of work soon led to its use for many maintenance operations, and, more recently, for the preparation of plate edges for welding. Since gouging is still very much in its infancy, the following discussion of current applications will undoubtedly suggest many additional uses for the process.

Briefly, gouging provides a means for quickly and accurately removing a narrow strip of surface metal from steel plate, forgings and castings. This is essentially what is done in conditioning steel when defects are removed by the oxy-acetylene deseaming blowpipe. The principle of the process is based on the fact that if a nozzle designed to deliver a relatively large jet of oxygen at low velocity is properly manipulated, a smooth, accurately-defined groove can be cut or gouged out of the surface of the metal. By using different nozzles and manipulations, the groove can be varied in width and depth at the will of the operator.

Once this relatively simple principle is understood, many uses for the process will suggest themselves. At present these can be classified conveniently in five groups: (1) gouging the backside of electric welds; (2) removal of weld metal, such as temporary tack-welds and defective welds; (3) maintenance and scrapping operations; (4) plate-edge preparation; and (5) miscellaneous uses. Applications of these five groups will be discussed in the order named.

In the fabrication of steel vessels, tanks and other welded structures, the root of the initial weld is usually re-

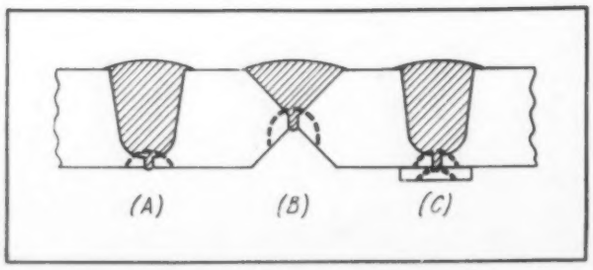

FIG. 1—The dotted lines indicate the metal removed by gouging in conventional weld designs. (A) U-groove preparation; (B) Double-vee preparation; and (C) U-groove preparation with backing-up strip. Original weld deposits are shown by cross-hatched areas.

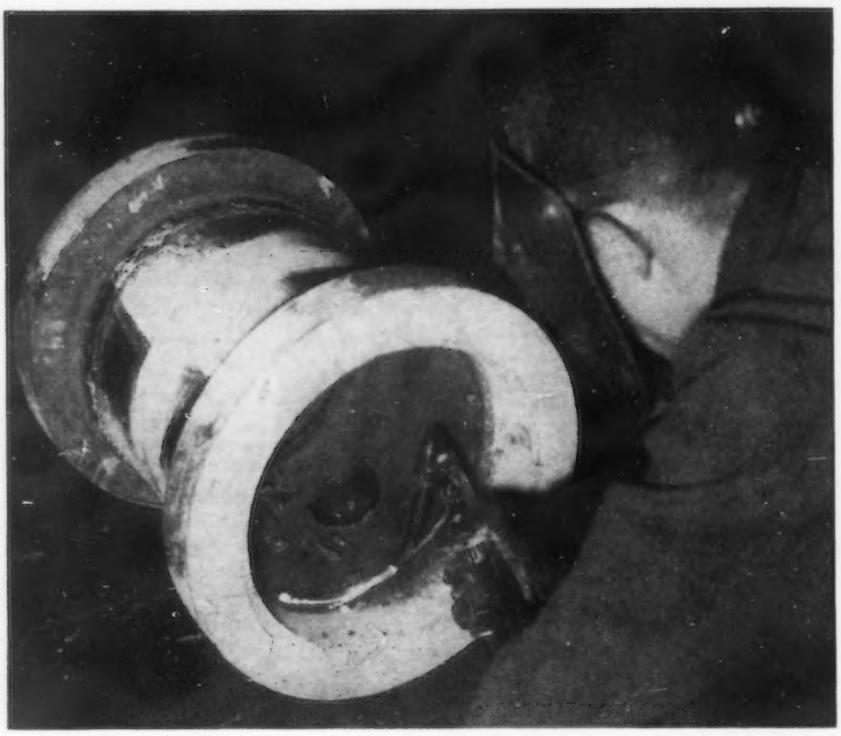

FIG. 2—The initial weld or tack-weld is being quickly removed from the inside of this pipe section by gouging.

moved so that clean metal is assured when the back weld is made. This is one of the applications for which the gouging blowpipe was originally designed, and many tests in both laboratory and field show that the process is not only much faster, but also considerably more economical than other methods of weld removal. As an example, in the fabrication of a tank only 20 min. was required to gouge backside of 25 linear ft. of welded seam, including 12 ft. of longitudinal weld and 13 ft. of circumferential weld. Other methods on this same job formerly required at least 3½ hr.

Fig. 1 (*A*) shows the conventional U-groove preparation in weld design. The section enclosed by dotted lines is removed by gouging, brushed free of slag, and then electric welded. The usual double-vee preparation is indicated by Fig. 1 (*B*). Here, the same procedure is followed as in 1 (*A*), the only difference being in the type of weld design. Fig. 1 (*C*) shows a third method of U-grooving when a backing-up strip has been used to aid penetration in the initial weld. In this application of gouging, the operation consists of first removing the center of the backing-up strip without cutting into the base metal, then parting the small tack-welds that hold the strip to the plate. When this has been done, the metal contained within the second dotted line is removed by a second pass of the blowpipe.

An interesting application of gouging is illustrated in Fig. 2. Here, the operator is removing the initial weld from the inside diameter of a large flanged pipe which is being fabricated as part of oil refinery equipment. After the pipe and flange have been joined by the initial layer of weld metal, a tack-weld, a second layer is deposited on the outside diameter of the pipe, then the first layer is largely removed by gouging and the pipe rewelded on the inside.

Removing Temporary Welds and Weld Defects

In many types of fabricating work, temporary tack-welds are used to hold plates, lining-up bolts, or lining-up tabs in position. At the completion of welding, these temporary supporting tabs, brackets, or bolts must be removed. General practice in the past has been to remove these sections by chipping. Here again, gouging has proved to be both faster and more economical.

A typical example of the usefulness

FIG. 3—These welded studs are removed by gouging in less than one-tenth the time formerly required.

FIG. 4—The gouging operator is removing a defective weld from the deck plate of a lake freighter.

of gouging for this type of work is found in the removal of studs welded to pipe for testing purposes. During the laying of a 48-in. pipe line in Canada, numerous special sections could be tested only by clamping a 2½-in. thick header to the ends of the sections with the header held in place by 1½-in. diameter studs welded to the pipe. Fig. 3 shows how the gouging blowpipe was used to remove these studs after the pipe section had been tested. Only 2 min. was required to remove a stud as compared with the 21 min. it formerly took to remove one.

Sometimes visual or X-ray examination of a welded section will disclose a defective zone of metal that must be removed and replaced. This can be done quickly and completely by spot gouging. The nature of the resulting cut is a narrow U-shaped groove which can be readily filled with new weld metal. A minimum of metal is removed, making this a rapid and economical process.

When a weld shows defects for any great distance, it can be removed in its entirety by gouging. Fig. 4 shows the removal of a cracked weld in the deck plate of a lake freighter. The gouging operation, of course, prepares the section for rewelding.

Gouging is also valuable for relocating welds in welded construction. For instance, in the plant of a machinery manufacturer, a large excavator was ready for shipment when tests indicated that certain parts welded to the boom stick would have to be relocated. Thanks to the accuracy and control possible with the gouging blowpipe, the fillets weld that secured the parts was removed without injuring the main members of the boom. Since this excavator was already two days overdue, at a penalty of $100 a day, the speed of the gouging operation proved doubly valuable.

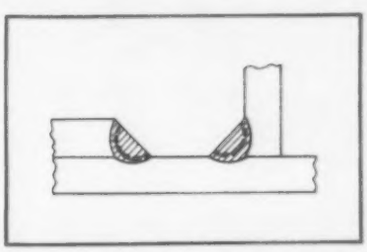

FIG. 5—The dotted lines indicate the amount of the fillet weld which is removed in dismantling structures by gouging.

Maintenance and Scrapping Operations

When a piece of machinery breaks down, one of the most important factors in its repair is the time which elapses before it is back on the job again. Welding has already been a vital factor in reducing shutdown time; now, gouging as a means of preparation for welding reduces the time still further. Cracks in large cast steel sections, heavy forgings, and thick plate can be grooved for welding in a matter of minutes by gouging. Gouging apparatus is particularly valuable in mines, smelters, rolling mills, and, in fact, any plant where the maintenance of heavy machinery is an important factor in production.

In one plant, production was at a complete standstill when it was found necessary to remove a large pinion gear from the drive shaft of a 100 ton-per-day lime kiln. The gear was 15 in. in diameter and 18 in. long and had frozen to the shaft. After workmen had spent 6 hr. without success trying to remove the gear by pressing it off, the gouging blowpipe was employed and the job completed in 20

FIG. 6—This ¾-in. plate is being U-grooved in preparation for welding. The plate, which is supported by a planer bed, rides past the stationary blowpipe.

ABOVE

FIG. 7—A U-groove in circular plate is prepared by rotating the work on a turntable.

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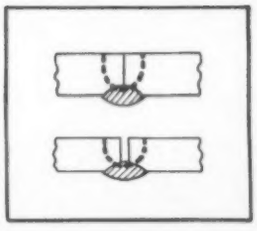

FIG. 8—The dotted lines indicate the metal removed by gouging in the preparation of butted plate edges for welding.

alternative to gouging is the process of planing. With the development of the gouging process, however, metal fabricators now have at their command a method which will fulfill most of their requirements in preparing plate edges for welding.

Short lengths can easily be gouged by hand, while longer lengths can be gouged by mounting the blowpipe on a cutting machine, or by placing the work on a suitable traversing device, such as a planer bed. By varying the nozzle size and angle of blowpipe to the work, a variety of edge contours can be produced.

Fig. 6 shows a typical mechanized setup for U-grooving the edge of ¾-in. plate. The plate is merely placed on a planer bed and lined up so that the edge to be prepared is parallel to the travel of the bed. The blowpipe is held by a special mounting and is stationary during the operation.

An interesting arrangement for preparing the edges of circular plates is shown in Fig. 7. Here, the plate is placed on a turntable and rotated past the blowpipe. A remarkably true U-groove is the result. This plate is to be used to form part of a new coupling

BELOW

FIG. 9—The operator is gouging a groove in preparation for welding two butted deck plates of a dredge.

min. In this same plant, a 12-ft. diameter wheel was repaired by gouging in one-third the time which would have been required by any other method. Also, pulverizer hammers are now grooved out for welding in one-quarter the time it used to take.

The ability of the gouging blowpipe to cut to close tolerances without damaging the base metal is of great value in scrapping operations. Welded structures can be dismantled at high speed by gouging out the welds, and the plate thus salvaged can be prepared for reuse by oxy-acetylene machine-cutting. The dotted lines in Fig. 5 indicate the amount of the fillet weld which should be removed in dismantling structures by gouging.

Plate-Edge Preparation

One of the most recent applications of the gouging process is for the preparation of plate edges for welding. Although a straight bevel is easily made in plate with a cutting blowpipe mounted on a cutting machine, whenever a U-groove is specified, the only

for a shaft, and, in final assembly, is welded to a flame-cut steel ring that fits about its outer circumference.

Fig. 8 illustrates a method for preparing edges where the plates are either butted together or spaced apart as shown. After the initial bead has been deposited, the portion indicated by the dotted lines is removed by gouging to form a clean U-groove for welding. The initial bead may or may not be removed later. Fig. 9 shows a practical application of the U-grooving of butted plates. Here, working on the deck plates of a dredge, the operator is gouging a groove between two plates butted together. An excellent job can be made by hand in preparing joints of this type in plate up to ¾ in. thick.

It should be mentioned that the quality of the surface prepared for electric welding by gouging is high and that such a surface is not detrimental to the weld. X-ray examination of electric welds made in grooves cut by gouging have shown exceptionally clean welds.

The gouging principle can be used to considerable advantage for flame-machining operations. Fig. 10 is a close-up view of the contacting side of a canal lock gate and shows how the 8-in. square bumper pads have been cut down approximately ⅜ in. by gouging. This application suggests a whole new field of uses for gouging in metal-shaping and trimming processes.

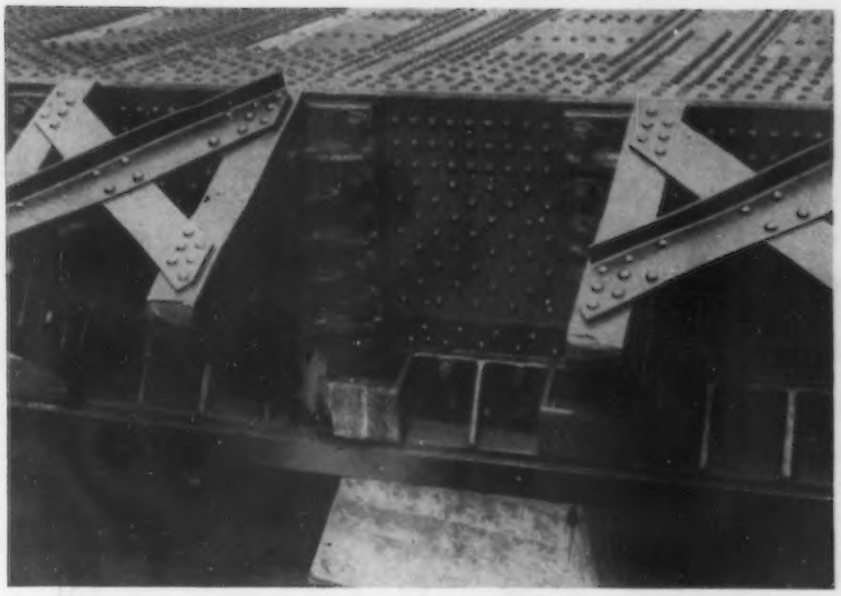

FIG. 10—This view of the contacting side of a canal lock gate shows how the bumper pads have been cut down ⅜ in. by gouging.

Gouging is also used for removing surface defects and for preparing cracks in steel castings for welding. Good results have been obtained on this type of work, but proper technique must be employed.

(To be concluded)

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INTERIOR view of one of 25 express cars built for Southern Railway Co. at Bethlehem Steel Co.'s Harlan plant. Mayari R steel was used extensively in underframe, roof, and sides, resulting in an estimated weight saving of 18,000 lb., or about 14 per cent.

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HEAVY-DUTY BORING LATHES FOR EXPORT

DELIVERY is being completed by Niles Tool Works, subsidiary of General Machinery Corp., of a number of large horizontal boring lathes for shipment abroad.

These machines range in size from 70 ft. to 279 ft., overall, and in weight from approximately 250,000 lb. to 1,000,000 lb. The smallest lathe is designed to take a workpiece 20-ft. long, with a maximum outside diameter of 48 in. and bore a 30-in. hole through the center, working from one end only. The largest machines are designed to bore a 24-in. maximum diameter hole from both ends up to 48 in. outside diameter 82 ft. long.

Niles Tool Works had previously built a number of rough boring lathes of a similar type for use in this country and abroad, but this contract called for lathes capable of both rough and finish boring hoops, liners, and tubes, under rigid restrictions as to permissible runout. The principle involved in building these new lathes is basically the same as that of the previous rough boring lathes with the exception that a much higher degree of precision had to be exercised.

Cast iron or cast steel spools running in babbitt bearings were formerly used for both the main drive spindles and revolving rests. In the event that careless chucking of the forging threw a heavy load on the bearing, the babbitt would wipe instead of cut the journal of the spool. When the problem of designing these new lathes for finish boring as well as rough boring was raised, it was determined that the running clearance of the bearings must not exceed 0.008 in. At the same time, the bearings had to be narrow so as to facilitate chucking of the forging. Speeds, however, were low, being only 2 to 20 r.p.m.

UNUSUAL features of a number of heavy-duty boring lathes completed recently for export are outlined herein. These machines are equipped for boring only instead of boring and turning, and are designed for both rough and finish boring of hoops, liners and tubes. Also in accord with European practice, the design provides for both push and pull boring, the first for piercing the solid and the pull boring for enlarging the bore. High precision was required in the building and tooling of these machines.

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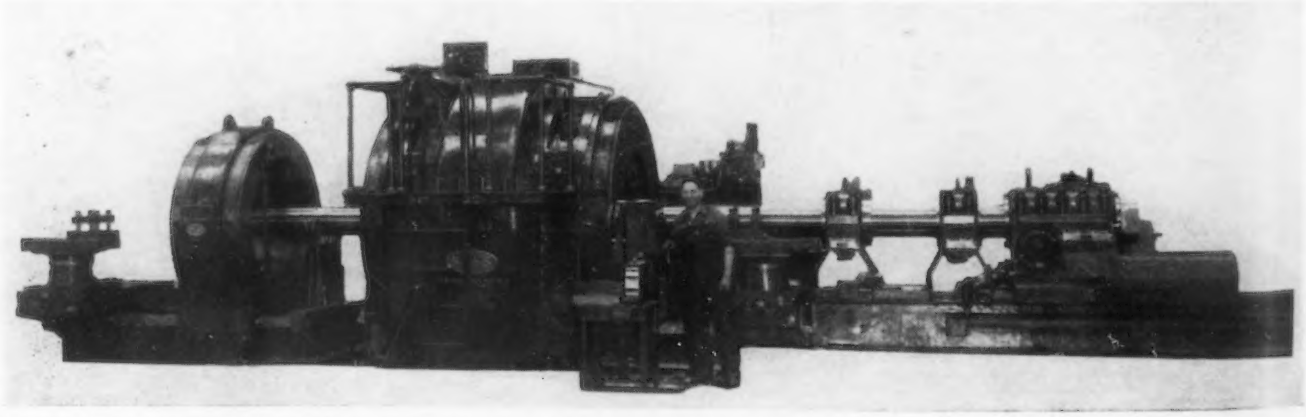
In the case of ordinary lathe spindle bearings, the length is usually from one and a half to two times the diameter. The reverse is true of these new lathes, where the diameter of the bearing is two and a half times the length. Consequently, removable bronze bearings had to be used to reduce wear to a minimum and preserve the original alinement. This necessitated the use of flame hardened steel spools on the driving spindles and revolving rests.

The main drive spools, which are the same on all the lathes, consist of two forged steel sections which are securely bolted together. These units were made by Carnegie-Illinois Steel Corp. from 62,000-lb. ingots of S.A.E. 1040 coarse-grained steel and forged to shape in their commercial forging division at the Homestead plant. After being forged and rough turned they



ONE of a number of boring lathes recently completed by Niles Tool Works for export shipment. The smallest machines, working from one end only, will bore a 30-in. hole through work 48 in. in O.D., 20 ft. long; the largest will bore a 24-in. hole from both ends in work 48 in. in diameter, 82 ft. long.

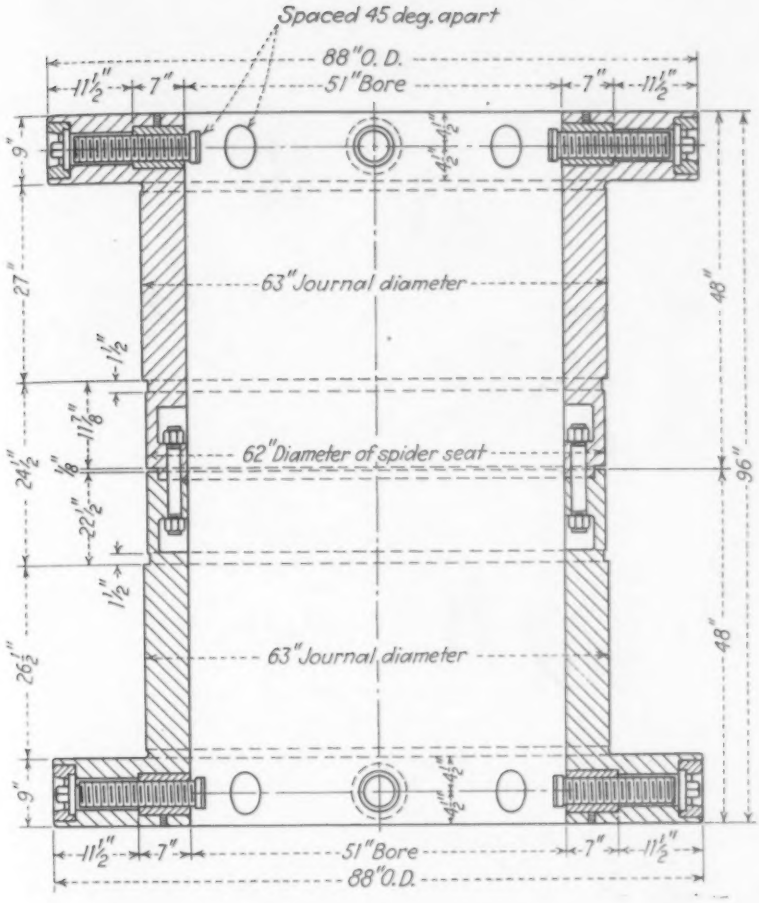


FIG. 1—Dimensional sketch of the driving head spools.

were delivered to the Westinghouse Electric & Mfg. Co. for finish machining, flame hardening of the bearing surfaces, and finish grinding. Each finished forging, two being required on each driving head, weighed approximately 22,000 lb. Dimensions of the driving head spools are shown in Fig. 1.

Revolving rest spools were single forgings made in pairs from 69,000-lb. ingots, finish dimensions being shown in Fig. 2. These were fabricated and finished in the same manner as the main drive spools.

Bearing surfaces were flame hardened to 400-450 Brinell, after which the surface was finish machined and ground. Special equipment and procedure were developed by the Westinghouse and Carnegie-Illinois organizations to do this work and no cracking or checking developed on any of the spools, every piece being carried through to completion.

Bearings Continuously Lubricated

Bearing lubrication called for careful consideration, as a single piece handled in one of these lathes might weigh as much as 150 tons. Approximately two-thirds of this weight is carried by the main spindle and the other third by the revolving rest while the work is being centered. In the large lathes four auxiliary roller supports (two at each end) are available after the piece has been spotted, two spotting carriages being provided on each lathe. High starting torque likewise intensifies the lubrication problem.

A separate motor-driven pump unit consisting of two high-pressure pumps and a large volume, low-pressure pump furnishes continuous lubrication to the center drive unit. The oil is forced

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FIG. 2—Finish dimensions of revolving rest spools, which are single forgings made in pairs from 69,000-lb. ingots.

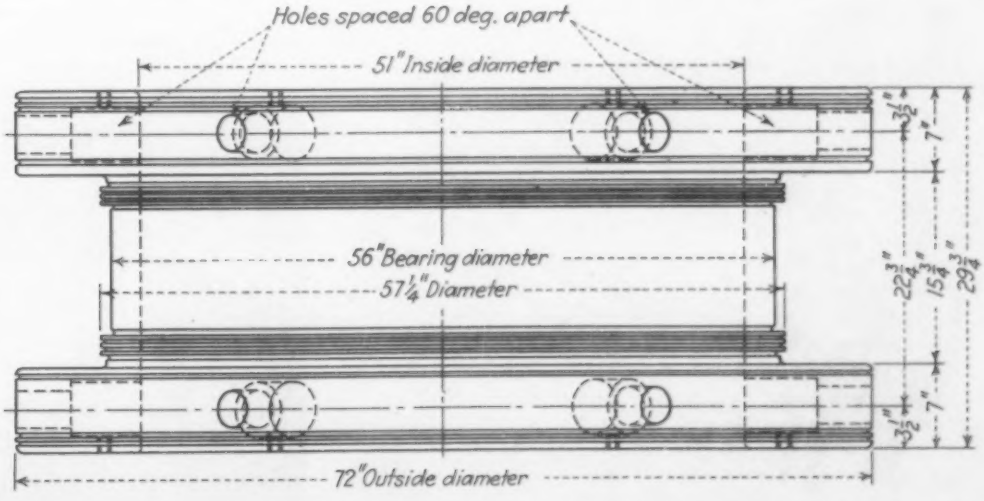

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FIG. 5—Boring tools used in making acceptance tests.

underneath each bearing through the opening shown in Fig. 3, and additional oil is distributed by gravity to several points on the periphery of the bearings. Experience has demonstrated that a single oil supply inlet would not be satisfactory as the oil film would not carry completely around the bearing under the conditions existing in lathes of this nature. The high-pressure systems are driven by 7½ hp. motors and are designed for variable pressures up to 1000 lb. per sq. in. They have a capacity of 16 gal. a min. per bearing. The low-pressure systems, driven by ¾ hp. motors, will supply 50 gal. per min. All drive gears and shafts are lubricated by gravity feed from the low pressure systems. Oil is forced through commercial filters before entering the pipes leading to the bearings.

Indicators Show Oil Flow

Indicators and a float gage are provided to show that oil is flowing to the bearings and that sufficient oil is available in the main reservoir. A pressure gage in the main supply line automatically stops the drive motor if the oil supply fails. The revolving rest spools are provided with similar high and low-pressure lubricating systems. S.A.E. 30 oil is used throughout.

The lathes are all equipped with centralized control from the operator's platform at the center driving head. From this platform the operator can direct all operations in chucking and unchucking the forgings as well as control the machine.

A 100 hp. main driving motor is provided on the large lathes and a 75 hp. motor on the smaller units. These motors are connected to the driving heads through multiple V-belt drives and steel gears. Fig. 4 shows the 100 in., 14 in. face, ring type gear mounted on the cast iron split spider attached to the drive spool forgings. These gears are made from S.A.E. 3145 steel, heat treated to 220 Brinell hardness, and have Maag type teeth. Main drive motors are provided with a 300 to 1200 r.p.m. speed range, a back-gear being installed in the gearing.

The main drive spools are equipped with 16 heavy screws for chucking the workpiece; the revolving rests have 12 screws. These are set up to 75 lb. pressure at the end of a 3-ft. wrench. The rests are hand traversed along the bed by a gear pinion engaging a rack bolted to the bed.

In accord with European production practice, these lathes are equipped for boring only, instead of both boring and turning as is the practice in this country. Likewise in accord with European practice, the design is such as to provide for both push and pull boring. Push boring will be used for piercing the solid and pull boring for enlarging the bore.

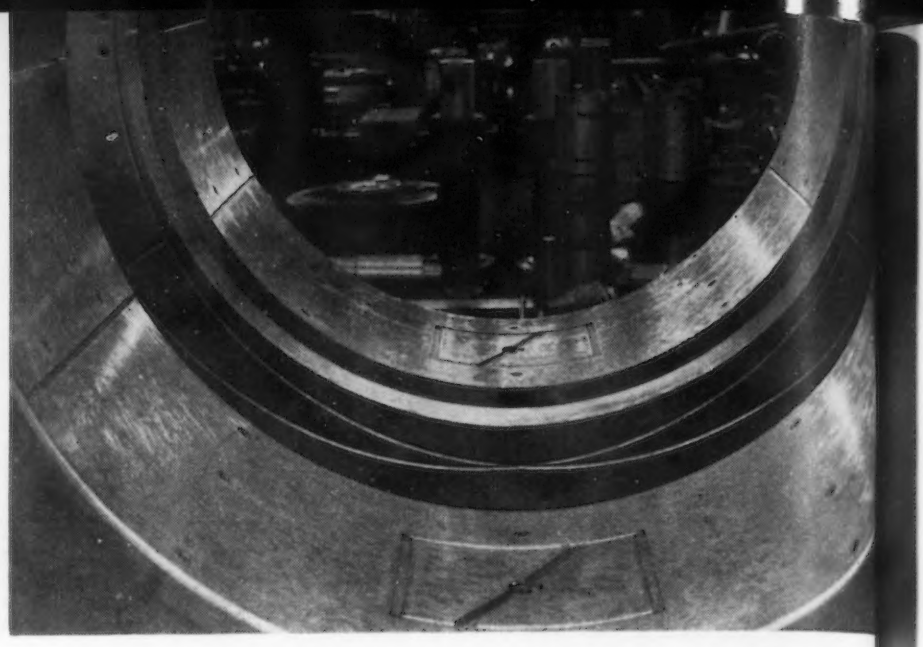
The large machines are equipped with two boring bars 12 in. in diameter with a 3-in. hole through the center for delivering coolant to the boring tools. One bar is approximately 103 ft. long and the other 56 ft. long. Boring bar feeds are driven by 5 hp. variable-speed motors. Separate 30 hp. motors connected through gearing in the feed box provide rapid traverse for the boring bars. Feed and traverse mechanisms are interlocked to prevent the operator from operating both motions at the same time. Feed and traverse clutches are operated by ¾ hp. motors through push button control. Boring bar feeds may be adjusted from 0.05 to 18.60 mm. per min.

Coolant is supplied to the tools through the boring bars by 25 hp. variable-speed motor driven pumps capable of supplying 212 gal. per min. at 114 lb. per sq. in. in the large lathes and 158 gal. per min. at 142 lb. per sq. in. in the small units.

Severe Acceptance Tests

Acceptance tests were severe. Inasmuch as alloy steel forgings were

(CONCLUDED ON PAGE 92)



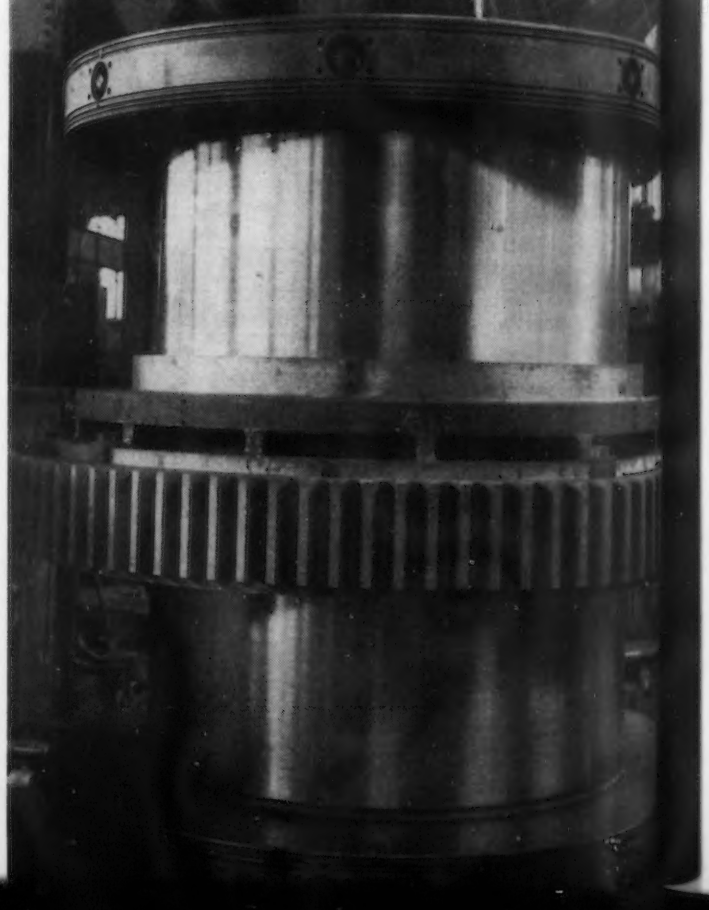
ABOVE

FIG. 3—Center drive unit bearings. Oil is forced underneath each bearing through the opening shown.

o o o

AT RIGHT

FIG. 4—Ring type gear, 100 in. diameter, 14-in. face, mounted on cast iron split spider attached to the drive spool forgings.



STEEL STANDARDIZATION

By A. L. HARTLEY
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LAST week the author presented two tables collocating data on steels required for machine tool work, and set forth the effects of various alloying elements on steel. Herein, additional tables and discussions are presented on the steels required by the machine tool builder. This is section II of a five-part story.

TABLES III, IV and V deal with several of the more prominent brands of tool steel in the classes required for machine tool work; the data shown cover analyses, recommended hardening temperatures, expected hardnesses and impact strengths. Although there are approximately 80 steels listed on these three charts, a close study of the various analyses will show that there are only about seven basic types involved. Note also that only manufacturers' trade name steels are considered in these tables, and there quite likely are other steels handled by jobbers that could be included in this group.

Two comparatively new types of non-deforming and abrasion-resisting tool steels have recently been announced by several of the tool steel mills. At the present time the base price of these steels is the same as that of the manganese oil-hardening types.*

The general claims* which are made for these new types of steel seem to indicate that they may prove suitable to replace both the non-deforming steels of the type shown in Table III and the abrasion-resisting grades as shown in Table V for the applications under consideration in this discussion.

Table VI lists the analyses of some of the better known high-speed tool steel of the 18 per cent tungsten, 4 per cent chromium, 2 per cent vanadium plus molybdenum types.

Carburizing Steels

Under the heading of "General Application Steels" screw-stock and low-carbon or low-carbon-manganese steels were listed as separate items. However, most machine tool plants can operate very satisfactorily without the screw-stock grade if a suitable carburizing grade is selected. The use of one item will reduce the total number of general application steels to five. It will result in making it possible to purchase the grade selected in larger quantities, thus obtaining a price advantage and making possible the use of more rigid purchasing specifications.

A disadvantage is the slightly slower machineability encountered in the carburizing grades. However, this is almost a negligible factor where parts are generally produced in small lots. One large machine tool plant that adopted this program two years ago has found that the disadvantage due to the slightly lower machineability rating is more than offset by the advantages as just outlined.

The data covering the low-carbon and carbon-manganese steels should

*These steels have approximately the following analyses: Type A—0.95 carbon, 0.40 manganese, 0.40 silicon, 5.25 chromium, 0.60 vanadium, 1.15 molybdenum, 0.025 maximum phosphorus, and 0.025 maximum sulphur; Type B—1.00 carbon, 2.00 manganese, 0.25 silicon, 1.85 chromium, no vanadium, 1.00 molybdenum, 0.025 maximum phosphorus, and 0.025 maximum sulphur.

Advocates of these types of steels make the following general claims for them: They have about the same non-deforming properties as the manganese oil hardening type listed in Table III, and have better impact properties than either the manganese oil hardening type or the high-carbon high-chromium type as listed in Table V. The abrasion resisting properties compare very favorably with those of the high-carbon high-chromium steels and under conditions of severe pressure they have shown better life due to the higher shock resisting characteristics. These new steels have approximately the same machineability as the manganese oil hardening types of tool steel and much better machineability than the high-carbon high-chromium type.

TABLE THREE—Non-Deforming Tool Steel

Manufacturer	Trade Name	Carbon	Manganese	Phosphorus	Sulphur	Silicon	Molybdenum	Chromium	Vanadium	Tungsten	Hardening Temperature, Deg. F.	Maximum Hardness After a 350 deg. F. Draw	Impact Izod Test Notched Drawn After 350 deg. F. Test, pounds	Base Price, Per Lb. §
Bethlehem	Tool Room †	0.90	1.20	.025 Max.	.025 Max.	0.25		0.50	0.20	0.50	1450 to 1475	63		24¢
Braeburn	Kiski	0.90–1.00	1.00–1.20			0.30–0.45		0.43–0.57	0.15–0.25	0.45–0.70	1500 to 1525	63		24¢
Braeburn	Special Oil Hard	1.10–1.20	1.25–1.50			0.15–0.30			0.15–0.25		1450 to 1500	62		24¢
Carpenter	Stentor	0.85–0.95	1.50–1.80	.020 Max.	.020 Max.	0.15–0.30					1400 to 1440	61		24¢
Colonial	No. 6	0.90–1.00	1.15–1.25	.025 Max.	.025 Max.	0.15–0.30		0.43–0.57	0.15–0.25	0.43–0.57	1425 to 1475	62		24¢
Columbia	EXL Die †	0.90	1.15	.025 Max.	.025 Max.	0.35		0.50		0.50	1450 to 1500	63	8	24¢
Crucible	Non-Changeable	0.90	1.25	.020 Max.	.020 Max.	0.25		0.50		0.50	1450 to 1500	63		24¢
Crucible	Paragon	0.91–1.00	1.50–1.75	.015 Max.	.020 Max.	0.35–0.45		0.50–0.75	0.15–0.25		1450 to 1500	63		24¢
Firth-Sterling	Invaro †	0.90	1.15					0.50	0.25	0.50	1450 to 1500	64	7	24¢
Halcomb	Ketos	0.85–0.95	1.05–1.25	.020 Max.	.025 Max.	0.20–0.30		0.40–0.60		0.40–0.60	1450 to 1500	63		24¢
Jessop	Truform	0.85–0.95	1.00–1.25	.020 Max.	.020 Max.	0.25–0.40		0.40–0.60	0.15	0.40–0.60	1450 to 1500	63	8.5	24¢
Jessop	HM Oil Hardening	0.85–0.95	1.50–1.80	.020 Max.	.020 Max.	0.25–0.45			0.15–0.25		1450 to 1500	63	19	24¢
Latrobe	Mangano †	0.95	1.62	.025 Max.	.025 Max.	0.32		0.20			1440 to 1475	62	19	24¢
Latrobe	Mangano Special †	0.95	1.12	.025 Max.	.025 Max.	0.30		0.50	0.22	0.52	1475 to 1500	63	8	24¢
Ludlum	Deward †	0.96	1.62			0.29	0.28				1400 to 1440	62	19	24¢
Ludlum	Saratoga †	0.86	1.13			0.38		0.47		0.40	1450 to 1500	63	8	24¢
Midvale	Constant †	0.95	1.60	.015 Max.	.020 Max.	0.38					1400 to 1450	63		24¢
Republic	BF Arrestite	0.85–0.95	1.50–1.60	.020 Max.	.020 Max.	0.20–0.35		0.20–0.25			1425 to 1475	61	19	24¢
Universal-Cyclops	Wando No. 1	0.85–1.00	1.10–1.30	.025 Max.	.025 Max.	0.15–0.30		0.40–0.60	0.15–0.25	0.40–0.60	1450 to 1500	63		24¢
Vanadium-Alloys	Non-Shrink	0.90–1.00	1.20–1.40	.030 Max.	.030 Max.	0.15–0.30		0.43–0.57	0.15–0.25	0.43–0.57	1425 to 1475	61		24¢
Vulcan	Non-Shrink	0.85–0.95	1.50–1.60	.020 Max.	.020 Max.	0.20–0.35		0.20–0.25			1425 to 1475	61		24¢
Vulcan	Special Oil Hard	0.85–0.95	1.00–1.25	.020 Max.	.020 Max.	0.25–0.35		0.40–0.60		0.40–0.60	1425 to 1475	60		24¢

† Typical analysis only. Allowable variation probably approximately the same as shown for the other grades. § Base price in effect on date tabulated; all analysis subject to revision.

be carefully analyzed. Two or three of the steels having the most suitable properties for the required applications should be tentatively selected.

The properties of these materials should be carefully studied, and the one finally selected should be thoroughly tested in production before it is set up as a standard stock item. As may be observed from Table I (published last week), SAE X-1314 has suitable characteristics for parts requiring this type of steel. However, when this SAE grade is used for parts such as that shown in Fig. 1, the use of a double quench is recommended, because the surface of the uncarburized portion will frequently harden to approximately 40 R_c if the part is water quenched from the high temperature, i.e. 1575 deg. to 1625 deg. F. However, if re-quenched from 1425 deg. to 1450 deg. F. the surface will be well within the machining range.

If the conditions are such that a screw-stock is absolutely essential, the number of sizes stocked should be reduced to an absolute minimum.

C or C-Mn Steel

A medium-carbon steel finds considerable use in all plants, because of its low cost and comparatively good machineability. However, this type is too frequently selected at random and not purchased to rigid specifications. Many plants use as many as three or even four grades of medium-carbon or carbon-manganese steel where one carefully selected item could readily meet the requirements. To properly

meet the requirements such a steel should have good machineability, be free from defects, and have an average yield point of approximately 60,000 lb. per sq. in. (1-in. sections). It should also be suitable for such parts as lead screws, cross feed screws, elevating screws, etc. In view of the rapidly increasing application of the flame-hardening process a steel should be selected that can be successfully treated in this manner.

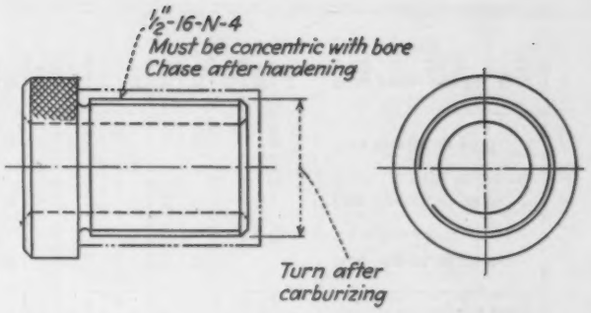
It is definitely known that un-alloyed steel can be successfully heat treated. However, the mass effect is much more pronounced than with the alloy types. It is also well recognized that carbon steels heat treated to a Brinell hardness of 269 to 302 are much more difficult to machine than some alloy steels of the same hardness. For these reasons it would seem advantageous to consider the medium-carbon or medium-carbon-manganese steels for un-heat-treated and flame-hardened parts. This procedure, of course, should not apply to high production plants where thousands of parts of a given piece are made. For such applications very close control of both raw material and heat treating is possible, and the use of carbon steels for heat-treated parts may be advantageous. However, such control is frequently not possible in smaller plants.

The data listed in Table II (published last week) should serve as a guide in selecting items that will satisfactorily meet all requirements after such an item is tentatively selected. A very thorough study and the necessary tests should be made to be absolutely sure that a particular steel has all of the expected properties. A suggested steel for parts which require a material that has characteristics as just outlined is SAE X-1335.

Alloy Oil-Hardening Steel

An alloy oil-hardening steel is the predominating material used in most modern machine tools; for that reason extreme care must be exercised in selecting the most suitable grade. The steel should have the necessary alloy content to insure uniform physical properties when employed for parts having heavy sections. However, it must not be alloyed in such a manner that it will have a low impact value when used for such parts as small gears. It should also have characteristics which make it suitable for flame hardening.

FIG. 1 — For a part such as this, SAE X-1314 steel has suitable characteristics, although a double quench is recommended; for thereby the surface will be well within the machining range. This material is designated as No. 1-A in Table VIII, and the heat treat is designated as No. B-4 in Table VII, both tables to appear in the Oct. 5 issue.



Although it is possible to select one grade of high alloy steel that could be employed for parts of all sizes, such a selection is usually not the most economical one. That is, the high-alloy steel that is necessary to insure uniform physical properties in a part such as shown in Fig. 2 is not only expensive, but is more difficult to machine than some of the lower-alloyed steels which would have satisfactory physical properties for smaller parts. For that reason the writer would suggest the selection of one alloy steel suitable for the more generally used parts, and a second grade which is more highly alloyed, to counteract the mass effect, for the larger parts. This latter grade should be listed as a special application steel.

The desired standard alloy oil-hardening steel may be selected from some of the numerous trade-name steels or one of the more generally used SAE grades. Table II (published last week) shows some of the more important characteristics of the SAE steels, and similar data can be readily compiled for any trade-name steel that might be considered suitable. Careful study of Table II will show the great amount of overlapping of physical properties in the SAE grades. If trade-name steels are considered and charted, it will frequently be observed that their properties are approximately the same as some of the SAE grades. Unquestionably, each of the various types have properties that make them outstanding for specific applications. However, it is obvious that it would be economically unwise for the average size plant to attempt to use all of the available grades.

The selection of the proper alloy steel can be tentatively made from data such as that tabulated in Table II. However, such data must not be the only consideration. The two or three typical items tentatively selected should be thoroughly tested in typical parts. Such parts should be tested under conditions of maximum requirements. All factors such as machineability as-normalized, machineability at maximum hardness within the machining range, wear resistance, flame-hardening characteristics, and mass effect should be carefully studied. The steel used for these tests should be obtained from a source that can furnish complete data, including analysis, McQuaid-Ehn grain size, microstructure, and the normalizing or heat-

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FIG. 2—The high-alloy steel that is necessary to insure uniform physical properties in a part such as this is not only expensive but is more difficult to machine than some of the lower-alloyed steels which would have satisfactory physical properties for smaller parts.

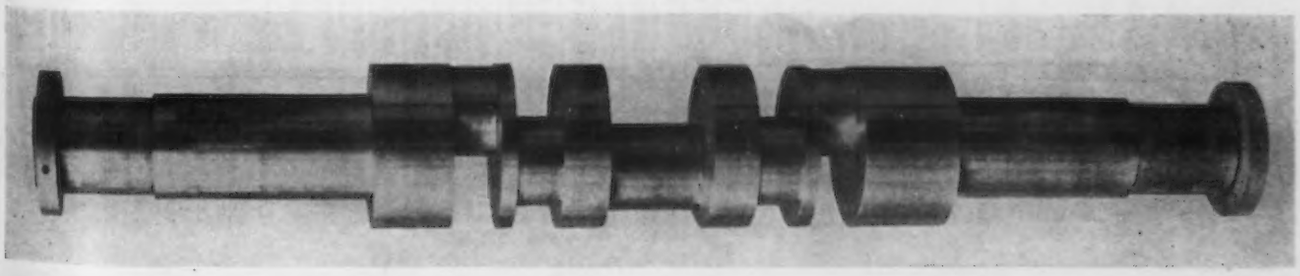

TABLE FOUR—Shock-Resisting Tool Steel

Manufacturer	Trade Name	Carbon	Manganese	Phosphorus	Sulphur	Silicon	Molybdenum	Chromium	Vanadium	Tungsten	Nickel	Hardening Temperature, Deg. F.	Maximum Hardness After a 350 deg. F. Draw	Izod Impact, at 55 R_c	Izod Impact, at 50 R_c	Izod Impact, at 45 R_c	Base Price, Per Lb. §
Bethlehem	Omega †	0.57	0.70	.025 Max.	.025 Max.	1.85	0.32		0.12			1625 to 1650	60				14¢
Bethlehem	67 †	0.50	0.25	.025 Max.	.025 Max.	0.25		1.25	0.20	2.25		1700 to 1750	55				27¢
Bethlehem	No. 71 †	0.65	0.80	.025 Max.	.025 Max.	2.00						1600 to 1650	61				12¢
Braeburn	Vibro	0.45–0.50	0.20–0.30			0.15–0.30		1.30–1.50	0.20–0.30	1.75–2.00		1775 to 1800	57	18	17	18	27¢
Braeburn	No. 11	0.53–0.58	0.75–1.10			1.80–2.10	1.28–1.36		0.45 Min.	0.20 Max.		1725 to 1750	58	14	14	15	27¢
Carpenter	RDS	0.70–0.80	0.25–0.45	.025 Max.	.025 Max.	0.15–0.35		0.90–1.20			1.50–2.00	1475 to 1550	56				19¢
Carpenter	Solar	0.45–0.55	0.30–0.50	.025 Max.	.025 Max.	0.90–1.10	0.40–0.55					1550 to 1600	58				14¢
Colonial	Tungo	0.45–0.55	0.10–0.30	.025 Max.	.025 Max.	0.10–0.30		1.50–1.80	0.20–0.30	1.75–2.25		1600 to 1650	56				27¢
Colonial	Silman	0.52–0.57	0.80–0.90	.025 Max.	.025 Max.	2.00–2.20		0.20–0.30	0.25–0.35			1525 to 1625	61				18¢
Columbia	Buster †	0.55	0.25	.025 Max.	.025 Max.	0.35		1.20	0.25	2.20		1600 to 1700	61	21	16	20	27¢
Crucible	Labelle Silicon No. 2	0.53–0.63	0.65–0.90	.015 Max.	.020 Max.	1.80–2.00	0.25–0.35	0.15–0.30				1600 to 1650	64	20	25	25	14¢
Crucible	Atha Pneu	0.40–0.50§§	0.20–0.35	.025 Max.	.025 Max.	0.25–0.35		1.10–1.40	0.15–0.25	2.30–3.00		1650 to 1800	58				27¢
Firth-Sterling	JS †	0.50	0.30					1.40	0.25	2.25		1650 to 1800	57	19	16	20	27¢
Firth-Sterling	Chimo †	0.50	0.90			2.00	2.00		0.25			1650 to 1700	56				18¢
Halcomb	Halcut †	0.45	0.25	.025 Max.	.025 Max.	0.25		1.25	0.25	2.75		1650 to 1800	58				27¢
Jessop	Top Notch	0.48–0.55	0.20–0.35	.020 Max.	.020 Max.	0.50–0.75		1.15–1.35	0.15–0.25	2.25–2.50		1650 to 1800	60	17	18	19	27¢
Jessop	Magic	0.50–0.55	0.80–1.00	.020 Max.	.020 Max.	1.85–2.10	1.00–1.20					1600 to 1700	62				27¢
Latrobe	XL †	0.50	0.25	.025 Max.	.025 Max.	0.25		1.35	0.25	2.12		1700 to 1750	55	20	15	18	27¢
Latrobe	CC †	0.60	0.35	.025 Max.	.025 Max.	1.02	0.60	0.35		0.67		1625 to 1650	60	11	13	15	14¢
Ludlum	Seminole †	0.43	0.26			0.29		1.42	0.27	1.66		1650 to 1750	55	18	16	18	27¢
Ludlum	602 †	0.52	0.69			1.62	0.43		0.17			1550 to 1650	61	17	19	21	14¢
Midvale	Duredge †	0.55	0.75	.020 Max.	.020 Max.	1.55	0.35					1550 to 1575					14¢
Republic	BF Special Punch	0.52–0.57	0.80–0.90	.025 Max.	.025 Max.	1.80–2.10		0.20–0.30	0.20–0.30			1625 to 1650	59	15	15		14¢
Republic	BF-M Tungsten	0.45–0.55	0.25–0.35	.020 Max.	.020 Max.	0.15–0.30		0.85–0.95		1.05–1.10		1500 to 1650	58	18	16	18	18¢
Universal-Cyclops	Alco	0.40–0.50	0.20–0.35			0.15–0.35		1.25–1.75	0.20–0.30	2.00–2.50		1650 to 1800	57.5				27¢
Vanadium-Alloys	Vanadium G	0.56–0.65	0.10–0.30	.030 Max.	.030 Max.	0.20–0.35		0.70–0.90	0.15–0.35			1425 to 1500	60				.235¢
Vanadium-Alloys	Silman	0.52–0.57	0.80–0.90	.025 Max.	.025 Max.	2.00–2.20		0.20–0.30	0.25–0.35			1525 to 1625	61				18¢
Vanadium-Alloys	Par Exc	0.45–0.55	0.15–0.30	.025 Max.	.025 Max.	0.15–0.30		1.50–1.80	0.20–0.30	1.75–2.25		1600 to 1650	56				27¢
Vulcan	4870	0.52–0.57	0.80–0.90	.025 Max.	.025 Max.	1.80–2.10		0.20–0.30	0.20–0.30			1625 to 1650	59				14¢

All analyses subject to revision. † Typical analysis only. Allowable variation probably approximately the same as shown for the other grades. For the correct hardening temperature for a specific application see specifications for the steel involved. § Base price in effect on date tabulated. §§ Also available with a carbon content of 0.50–0.60 per cent.

TABLE FIVE—Abrasion-Resisting Tool Steel

TABLE FIVE—Abrasion-Resisting Tool Steel

Manufacturer	Trade Name	Carbon	Manganese	Phosphorus	Sulphur	Silicon	Molybdenum	Chromium	Vanadium	Nickel	Cobalt	Hardening Temperature, Deg. F.	Average Hardness After 400 deg. F. Draw	Impact After 400 deg. F. Draw, Unnotched Izod Test Pieces	Average Hardness After 700 deg. F. Draw	Impact After 700 deg. F. Draw, Unnotched Izod Test Pieces	Base Price, Per Lb. §
Bethlehem	Lehigh "H" †	1.65	0.35	.025 Max.	0.30 Max.	0.40	0.78	12.00	0.30			1800 to 1850	63		62		43¢
Bethlehem	Acme Type †	2.20	0.25	.025 Max.	.030 Max.	0.40		12.00	0.80		0.50	1750 to 1800	64		62		43¢
Bethlehem	Lehigh S †	2.10	0.35	.025 Max.	.030 Max.	0.25	0.20	11.50	0.60	1.00		1750 to 1800	62		59		43¢
Braeburn	Superior No. 3	1.40–1.60	0.20–0.40	.030 Max.	.030 Max.	0.20–0.40	0.70–0.90	11.0–13.0	0.75–1.00			1800 to 1825	60		56		43¢
Braeburn	Superior No. 1	2.05–2.20	0.40–0.60	.024 Max.	.024 Max.	0.20–0.40		11.5–13.5	0.55–0.65			1800 to 1825	61	20	58	19.5	43¢
Carpenter	Hampden	2.00–2.20	0.15–0.35	.020 Max.	.020 Max.	0.20–0.40		11.5–13.0		0.40–0.60		1750 to 1800	62		59		43¢
Carpenter	610	1.40–1.60	0.20–0.40	.020 Max.	.020 Max.	0.20–0.40	0.75–0.85	11.0–12.5	0.20 Min.			1825 to 1875	60		56		43¢
Colonial	O-HI-O Air Die	1.50–1.60	0.15–0.30	.025 Max.	.025 Max.	0.25–0.45	0.75–0.85	11.5–12.5	0.75–0.95		0.35–0.45	1800 to 1850	64		59		43¢
Columbia	Super Die ‡†	2.10	0.30	.025 Max.	.025 Max.	0.90		10.5				1700 to 1750	65		62	20	43¢
Crucible	HYCC	2.10–2.40	0.25–0.35	.030 Max.	.030 Max.	0.30–0.60		11.0–13.0	0.15–0.25			1750 to 1825	62	23	59	23	43¢
Crucible	Airdi	2.10–2.40	0.20–0.35	.030 Max.	.030 Max.	0.30–0.60	0.75–1.00	11.0–13.0	0.15–0.25			1825 to 1875	62	39	58	39	43¢
Crucible	CCA †	1.50	0.30	.030 Max.	.030 Max.	0.50	1.00	12.0	0.25			1800 to 1850	59	64	57		43¢
Firth-Sterling	Cromovan †	1.60					0.80	12.5	1.00			1825 to 1850	62	57	58	53	43¢
Halcomb	Haldi †	2.25	0.30	.030 Max.	.030 Max.	0.50	1.00	12.0	0.25			1825 to 1875	62	39	58	39	43¢
Jessop	2C	2.10–2.25	0.40–0.50	.020 Max.	.020 Max.	0.50–0.75		11.5–12.5		0.50–0.75		1750 to 1800	62	20.5	60	20	43¢
Jessop	3C	2.10–2.20	0.40–0.50	.020 Max.	.020 Max.	0.50–0.60		12.0–13.0	0.15–0.25			1800 to 1825	62	20	60	20	43¢
Jessop	CNS Air Hard	1.45–1.65	0.25–0.45	.020 Max.	.020 Max.	0.20–0.40	0.70–0.90	11.0–12.0	0.20–0.30			1750 to 1800	61	56	58	53	43¢
Latrobe	GSN Special †	1.52	0.30	.025 Max.	.025 Max.	0.30	0.75	11.5	0.27			1825 to 1850	62	57	57	52	43¢
Latrobe	GSN †	2.12	0.55	.025 Max.	.025 Max.	0.50		13.25				1700 to 1750	62	20	55	19	43¢
Latrobe	Cobalt Crome †	1.50	0.25	.025 Max.	.025 Max.	0.50	0.75	12.25		0.50	3.25	1825 to 1850	64	56	60	50	55¢
Ludlum	Huron †	2.09	0.32			0.45		12.68	0.99			1750 to 1850	62	20	58	19.5	43¢
Ludlum	Ontario †	1.48	0.29			0.34	0.75	11.22	0.25			1800 to 1850	62	56	58	52	43¢
Midvale	Diamond A †	1.65	0.25	.020 Max.	.020 Max.	0.20		18.25				1775 to 1825					43¢
Republic	BF—404	1.50–1.60	0.25–0.35	.020 Max.	.020 Max.	0.20–0.40	0.70–0.80	11.5–12.5	0.20–0.25			1750 to 1850	63	65	61	69	43¢
Republic	BF—HC	2.10–2.25	0.30–0.40	.020 Max.	.020 Max.	0.30–0.40		12.0–13.0				1750 to 1850	60	26	58	22.5	43¢
Universal-Cyclops	Ultradie No. 1	2.25–2.50	0.25–0.40	.025 Max.	.025 Max.	0.15–.030		12.75–13.25	0.15–0.25			1700 to 1800	61		59		43¢
Universal-Cyclops	Ultradie No. 2	1.45–1.65	0.25–0.35	.025 Max.	.025 Max.	0.20–0.40	0.70–0.90	11.0–12.0	0.20–0.25			1750 to 1900	61		57		43¢
Vanadium-Alloys	Crocar	2.10–2.30	0.10–0.30	.030 Max.	.030 Max.	0.20–0.45		11.5–12.5	0.70–0.90		0.40–0.60	1750 to 1800	64		61		43¢
Vulcan	Alidie	1.50–1.60	0.25–0.35	.020 Max.	.020 Max.	0.20–0.40	0.70–0.80	11.5–12.5	0.20–0.25			1750 to 1850	63		61		43¢
Vulcan	Hi-Pro	2.10–2.25	0.30–0.40	.020 Max.	.020 Max.	0.30–0.40		12.0–13.0				1750 to 1850	61		58		43¢

All analyses subject to revision. † Typical analysis only. Variation probably approximately the same as shown for the other grades. For the correct hardening temperature for a specific application see specifications for the steel involved. ‡ 1.00 per cent Tungsten. § Base price in effect on date tabulated.

treating cycle used in processing the material. It is also advisable to make a series of fracture tests to show the effect of over-heat on the impact value and the grain structure, as the use of steel that is seriously affected by slight over-heat should be avoided whenever possible. Fine grain SAE 4145 has many of the desired characteristics including very good flame-hardening properties, good machineability at high hardness and other properties as tabulated in Table II. If machineability at hardness ranges above 302 Brinell is preferable to the low-carbon or low-carbon-manganese grade for parts that have intricate sections. The milder quenching medium combined with the more uniform characteristics of the steel greatly reduces the hazard of distortion and cracking in hardening. It is also essential for parts of heavy section because the mass effect is too pronounced for satisfactory core properties when unalloyed grades are used. The data listed in Table I (published last week) may be used as a guide to assist in making tentative selections.

CHART NO. SIX

HIGH SPEED TOOL STEEL

(18-4-2 Plus Molybdenum Type)

Manufacturer	Trade Name	Carbon	Tungsten	Chromium	Vanadium	Molybdenum
Bethlehem †	HV	0.80	18.50	4.5	2.25	0.65
Breaburn	Twin Van	0.78-0.84	18.0-19.0	4.0-4.5	2.0 -2.25	0.50-0.80
Carpenter	Super Star Zenith	0.79-0.86	18.0-19.0	4.0 -4.5	2.0 -2.25	0.50-0.80
Colonial	EVM	0.77-0.83	17.5-18.5	3.75-4.25	1.75-2.00	0.80-1.00
Columbia †	Vanite	0.80	18.5	4.25	2.10	0.65
Crucible	Rex Super Van	0.81-0.85	18.0-19.0	4.0 -4.5	2.0 -2.25	0.60-0.90
Firth-Sterling	HV Blue Chip	0.78-0.84	18.0-19.0	4.0 -4.5	2.0 -2.25	0.50-0.80
Jessop	Supremus EX	0.74-0.84	18.0-19.0	4.0 -4.5	2.0 -2.25	0.50-0.80
Latrobe †	Electrite 19	0.82	18.9	4.23	2.21	0.64
Ludlum †	ML	0.80	18.75	4.5	2.00	0.62
Republic	BF-IXL	0.76-0.84	18.0-19.0	4.00-4.50	2.00-2.25	0.70-0.80
Universal Cyclops	B-9	0.82-0.86	18.0-18.5	3.90-4.15	2.00-2.15	0.40-0.50
Vanadium-Alloy	EVM	0.77-0.83	17.5-18.5	3.75-4.25	1.75-2.00	0.80-1.00
Vulcan	Super H. S.	0.76-0.84	18.0-19.0	4.0 -4.5	2.0 -2.25	0.70-0.80

† Typical analysis only. The allowable variation is probably approximately the same as shown for the other grades. All of the analyses shown are subject to revisions.

not a vital factor, fine grain SAE 3140 steel should be given careful consideration. This grade is probably stocked more universally than any other grade of alloy steel. If most of the parts are of such a nature that maximum fatigue resistance is required, SAE 4640 should be considered. However, this grade is more expensive than either SAE 4145 or SAE 3140, and may not be as readily available in most localities.

Alloy Carburizing Steel

Many machine tool plants prefer the use of the alloy oil hardening steels for general purpose applications because of the higher physical properties and simple heat-treating cycle. However, a suitable grade of alloy carburizing steel is essential for parts that require a hard wear-resisting case and a tough, ductile core. The alloy grade of carburizing steel is usually

The grades tentatively chosen should be thoroughly tested in production and the most suitable material selected as standard. In making the tests extreme care should be exercised that the material tested is in the desired conditions and all heat treatments are properly handled. Fine grain SAE 4615 has many of the characteristics required. It has very good machineability in the untreated condition. When carburized and hardened it has a uniform hard wear resisting case and a very tough, ductile core. It is well recognized for its relative freedom from distortions during the heat treating cycle.

High-Carbon Tool Steels

All machine tool plants have requirements that can be filled by a properly selected grade of high-carbon tool steel. A grade having 1.00 to 1.15 per cent carbon, sulphur of 0.025 per cent maximum, and an inherent grain size that will result in medium penetration of hardness is suitable for most applications. This grade of steel has uniform hard wear-resisting case approximately ⅛ in. to ¼ in. deep and a tough core in sections ¾ in. in diameter. The smaller sections will harden through and the heavier sections will have a thinner case. All high grade tool steel mills produce steel with definite hardening characteristics, such as deep, medium, or shallow hardening, and uniformity can be relied upon if the correct grade is selected. However, a careful inspection of raw materials is essential to maintain uniformity. In view of the fact that extreme care must be taken in selecting a steel having suitable characteristics, it is desirable for small consumers to obtain all of their carbon tool steel from one source of supply. If such a policy is applied it will simplify the problem of adjusting complaints and will help to insure uniform results. However, if more than one source of supply is essential for reasons not controlled by the standards engineer or metallurgist, extreme care must be exercised to instruct each source as to the exact requirements.

Special Application Steel

The grades of steel briefly considered, when properly selected, will be suitable for most of the standard parts in any machine tool or related product. However, there are a few parts that necessitate the use of special types of steel. These special parts can introduce a great deal of trouble if very close limitations are not established. It is not unusual to find as many as 15 to 20 grades of special steel used in a plant where the requirements could be easily met with five or six. This condition is usually brought about by various engineers selecting a steel by a trade name without giving consideration to the analysis. A careful check of the steels used will frequently show that as many as three or four steels of the same basic type are employed. Such conditions increase the cost of the raw materials and greatly increase the heat-treating problems.

The five items previously listed (last week) under the heading "Class II Special Applications" will meet the requirements of almost all special problems encountered in the industries under discussion.

Ed. Note:—Next week the author continues his discussion of the steels used by machine tool builders, and recommends a group of steels suitable for all requirements encountered in most plants.

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TWO d.c. Reliance shunt-wound motors are connected in tandem to feed the steel sections through the preheating oven. Some speed drop in the smaller of the two motors prevents it from becoming overloaded. The preheating oven was devised by engineers of the Cleveland Crane & Engineering Co.

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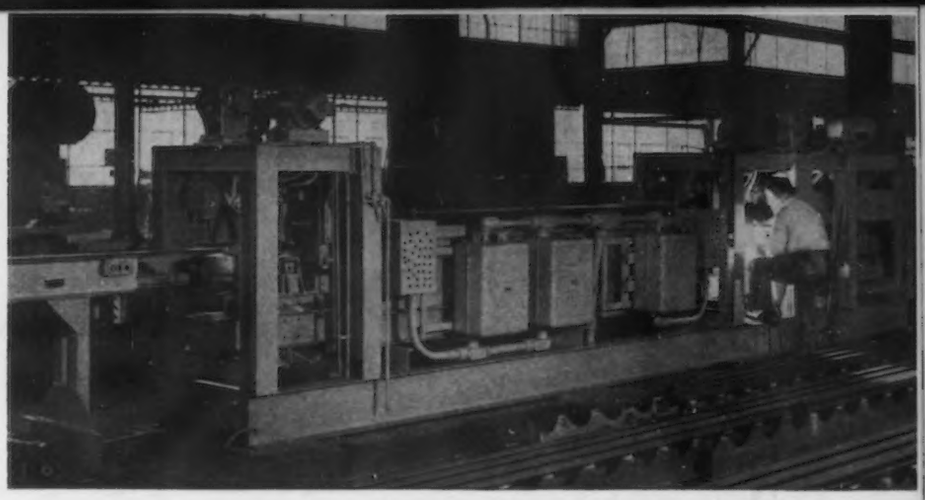


D. C. MOTORS IMPROVE FLEXIBILITY OF WELDING FIXTURE

THE successful execution of a new welding procedure for the fabrication of monorail sections in the plant of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, depends in part on the ability to vary quickly and easily the rate of travel of the steel beams through an oven in which they are brought up to a carefully predetermined temperature.

The brunt of the wear and tear of loads, which frequently amount to as much as 1000 tons a day, is borne by the lower rail section of a monorail system. This, in the case of the Cleveland Crane product, has a raised wearing strip which is rolled from expensive, high-carbon steel and is electric welded to a top flange of ordinary rolled structural steel to form a beam of sufficient strength to permit the use of suspension spans of as much as 20 to 30 ft.

The welding on of the high-carbon steel is not, however, an easy proposition. Cracks are likely to occur in the welds or near them in the lower rail section, if nothing is done to offset the excessive localized heating which is caused during the welding operation.

The new fixture shown in the accompanying illustration, which was developed by the company's engineers, combines a preheating oven and an ingenious arrangement of air-operated rolls. These position the top and bottom sections of the monorail and move them along together through the oven and past two welding operators who are located on either side of the exit from the heating zone.

The oven is 12 ft. long and contains 60 kw. of heating elements. These are installed in two banks, with separate thermostatic controls. In the approximately 10 min. the monorail sections are in the oven they are brought up to a temperature of 325 deg. F.

Two squirrel cage motors, operating at 1150 r.p.m., were originally applied to feed the steel through the oven and through positioning rolls which line the sections up so accurately that the finished monorail tracks are always interchangeable.

However, when it became desirable to extend the new welding procedure to all three sizes of monorail which the company regularly makes, the problem arose of heating the various size rails to the same pre-welding temperature. Whether to increase the temperature of the oven or to decrease the rate of travel of the heavier steel sections through it was a question which was decided in favor of the latter method.

To obtain the range of speeds required for the more extensive operation, two d.c. shunt-wound motors of 1 and 2 hp. respectively, and capable of operating at 1150 to 2300 r.p.m., were recommended by engineers of the Reliance Electric & Engineering Co., Cleveland. These motors were installed in tandem, one at each end of the oven, and connected through speed reducers to separate sets of hold-down and positioning rolls.

Since the first 15 ft. of the steel must pass through the oven before any welding can be done on it, top and bottom sections of the beams are tack-welded at a single point just before they enter the oven. The lower rail section is then "towed" along with the upper part at exactly the same speed, eliminating the need for separate motor drives for the two sections.

The hold down rolls exert sufficient pressure on the top section of beam to permit driving it along by this means. Through chain and sprocket connections from its speed reducer, the smaller of the two motors, located at the entrance to the oven, pushes the monorail into the oven at a uniform surface speed. There is sufficient slip in the two motors so that it is not necessary to disconnect the first when the steel is engaged at the exit to the oven by the second. Moreover, the greater part of the power of the larger motor is directed toward operating the greater number of top and side positioning rolls required at this point to insure the exact alinement of top and bottom sections of the two steel beams.

Each motor is equipped with a reversing switch within easy reach of the welders, and each set of rolls has its own air valves. This makes it possible to stop the travel of the steel instantly to correct any faulty alinement, or to go back over a weld a second time, should this be necessary. The division of load between the two motors was established at the outset by adjustment of individual slide wire rheostats with which each is equipped. A tandem rheostat is used for changing the speed of the motors together.

Use of the new welding fixture has made it possible for two welders to produce ten 40-ft. stock beams a day, compared with a previous production of only 120 ft. per man per day. Of even greater importance is that the quality of welds obtained has been materially improved as a result of the new installation, according to the company engineers.

A NEW PRINCIPLE IN TOOL

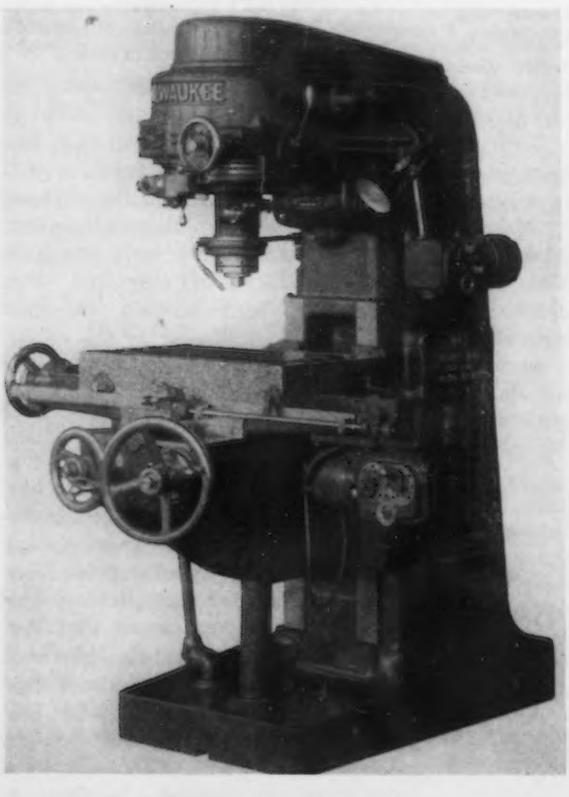
A MACHINE has been developed by the Kearney & Trecker Corp., Milwaukee, that, because of a new milling principle, is able to reduce the number of setups ordinarily required during the construction of tools and dies. In general appearance the machine resembles a standard high speed vertical milling machine and can be used as such, but as implied by its name, rotary head tool and die milling machine, the chief feature is the rotary head, in which is mounted a spindle on a cross slide that can be set off-center radially and rotated in a horizontal planetary motion through a full circle while the spindle itself is rotating. Both the rotary head and the spindle can be run in either direction, independently of each other.

In order to further the possibilities of completing dies in one setup, there has been designed a line of attachments which cover operations other than straight vertical rotary head milling. These attachments permit slotting and cornering, right angle milling, universal milling and cherrying. The cherrying attachment, in fact, is entirely new insofar as its adaptation to a vertical milling machine is concerned. This mechanism permits the generation of cherrying type cuts without using cherrying cutters and half centers. Combining the motion of the rotary head with the cherrying attachment gives circular movement of the cutter in both vertical and horizontal planes, making it possible to generate male or female spherical cherries or any part of a sphere. Another feature of the cherrying attachment is that any angle from 0 to 360 deg. can be milled. When the rotary head motion is combined with the angular ability of this attachment, milling of conical cavities and projections is also possible.

Specifications

The spindle can be set off-center up to 4 in. by means of a hardened and ground screw and micrometer dial reading in thousandths of an inch. The rotary head drive mechanism has 16 feed changes ranging from 1/5 to 3 r.p.m., and is equipped with a T-slot into which trip dogs can be set, providing automatic feed throwout at any point on the circumference of the circle. The spindle is mounted in a quill and has 3 in. of vertical movement, operated either by hand or power. Hand adjustment, in thousandths of an inch, is indicated by a micrometer dial. Vertical power feeds range from 0.0002 to 0.008 in. per rev., permitting precision boring. Spindle speeds range from 250 to 6000 r.p.m. in infinite steps due to variable pulley drive.

Numerous constructional features make this machine particularly adaptable for tool and die work. It combines the strength and rigidity necessary for long life maintenance of accuracy. The knee is wide and has a long bearing area on the column, thus providing a sturdy support to saddle and table. The



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THE rotary head tool and die milling machine, with planetary motion to the spindle, combines the ability to apply jig boring principles and to do precision boring work within its range, with the cherrying features of a die sinker. In addition, it has all the applications of a standard vertical milling machine.

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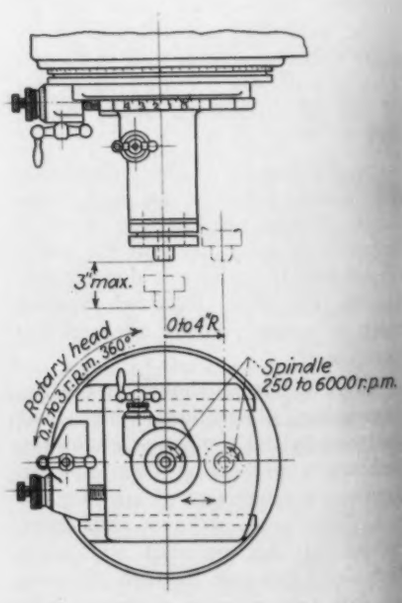

DIAGRAMMATIC sketch of rotary head showing rotary head motion, method of setting spindle off center, vertical adjustment of spindle and linear limits of various movements.

AND DIE MILLING

saddle is of such length as to always support the table without overhang through its entire range of movement. The table is of standard milling machine construction having standard T-slots and provision for coolant return. It has an overall working surface of 30 x 16 in.

Precision hardened and ground screws are provided for longitudinal, cross and vertical movements of the table. Clutch type handwheels control all three movements, and the longitudinal and cross movement screws are equipped with adjustable nuts for elimination of backlash. The large micrometer dials read in thousandths and may be locked in place. Micrometer rods, troughs and built-in dial indicators can be had so that layout and precision boring can be done to 0.0001 in. accuracy if desired.

Arrangements are provided for cooling the cutter either by a stream of coolant or by air blast. The nozzle follows the cutter even if the spindle head be revolving in a planetary motion.

The principal field of application for a machine of this type is said to be in the precision tool and die room where a great variety of work is done. In the making of die casting dies as well as plastic dies, in the extrusion die field, and in the field of punches and blanking dies, there exist possibilities for improvement both in accuracy and time. The making of templates and profiles where mechanically accurate generation in straight line and radial dimensions is desired is another field which has long felt the need of a machine such as this. A further and expanding field is in the making of hobs to be used in the impression molding and the forging die field.

Work From Centerlines

In practice, the die is set up on the machine table by setting the cross and longitudinal dials at zero on selected centerlines; thereafter all dimensions are taken from these common base lines, including various arcs, radii and angular cuts. For example, if a cloverleaf were to be cut, the blueprint would locate the centers of the three semicircles by giving the distance from the common base lines, and the radius of each leaf. The operator would set his machine and locate the center of each leaf by setting off on his cross and

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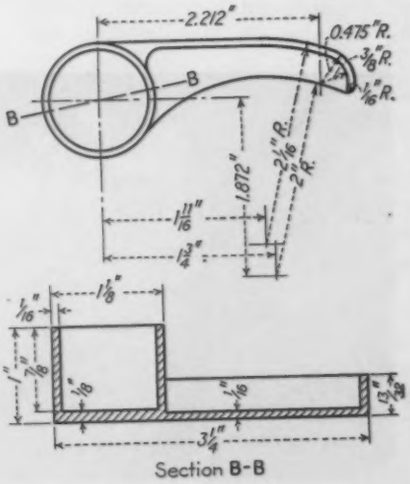
AT RIGHT

THE best previous time for milling this handle die was 56 hr. On the rotary head milling machine, the total time to produce this die casting die was 14 hr. for the two impressions, including all milling and boring of cavities. This job was finished at one setup.



Section B-B

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AT LEFT

COMBINING the motion of the rotary head with the cherrying attachment shown makes possible the circular movement of the cutter in both vertical and horizontal planes so that any part of a sphere can be generated.

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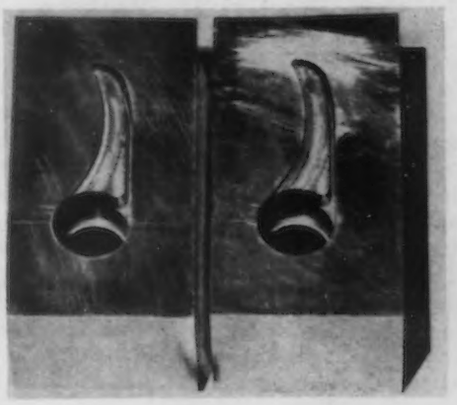


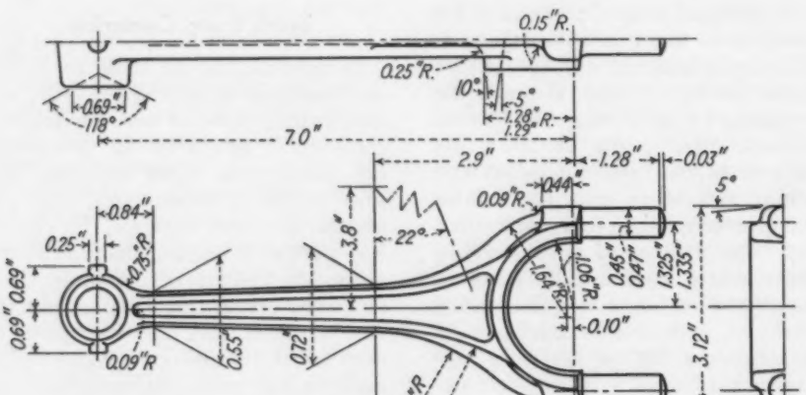
longitudinal dials the distance from the base line. He would then set the rotary head cross-slide off center the distance indicated from the radius of the leaf. By taking every dimension from the same base no one measurement is dependent upon a previous one for its accuracy, and errors are not accumulated.

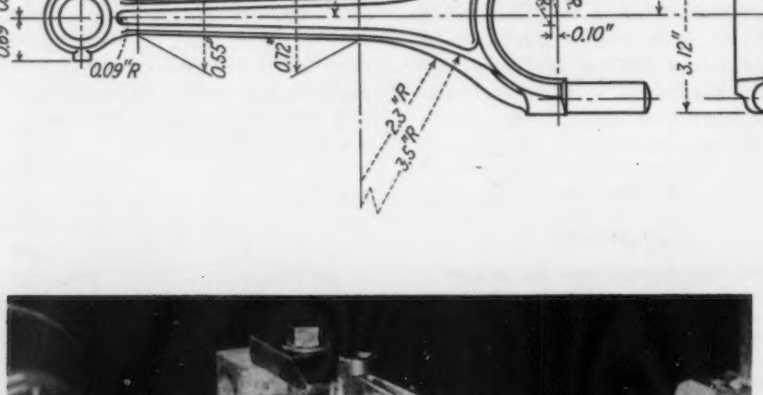
By means of a common base established for the die, it is possible to run several shifts of die makers on the same die. One man can take up where the other left off, or he may also work on an entirely different part of the die. In fact, two different dies may be set up on the table and worked on by different operators on alternate shifts. The value of such an arrangement is the possibility of milling a die requiring a considerable length of time for completion and shorter run dies at the same time. An operator on one shift can thereby continually work on the more complex die, while an operator on the other shift could be doing shorter jobs.

Duplication by Origination

The rotary head machine is intended primarily for the making of original dies and cavities. Duplication, in the strict sense of the word, is outside the field of its application. However, in the field of multiple cavity dies it is possible to mill a number of cavities in the same die block by originating each individual cavity. The method by which this is accomplished is to arrange the center lines of the cavities a certain fixed distance apart. With each cavity the same distance apart the rotary head mechanism may be set-up so as to mill one part of the cavity. By stepping over on the longitudinal feed of the table the exact distance that each cavity is apart, it is then possible to make a number of cavities which are exactly alike.

Though this machine is just now being formally introduced to the trade, it has been in service for over a year in various plants and has performed a multitude of tasks. From these have come reports of vastly increased efficiency. In the manufacture of a die casting die for a magneto counter weight, for example, the K. & T. rotary head machine was used to mill a four-cavity die using the multiple cavity method, whereby each cavity is an origination. A similar multiple cavity die, using standard tool room equipment and requiring many setups had been produced in 156 man-hours; the K. & T. machine in one setup, accomplished the task in 72 man-hours, a saving of 84 man-hours actual labor, while obtaining at the same time greater accuracy and a reduction in scrap loss. Two other applications are illustrated.





UNDER other conditions, it was estimated that 110 man-hr. would be necessary to mill this master connecting rod hob. In the rotary head miller, the entire die was milled from a solid block in one setup with 41 man-hr. of labor.

Brazil Gains as Market For U. S. Industry

WASHINGTON — Brazil is a principal foreign market for electrical equipment of American manufacture, having advanced from fifth position in 1936 to that of third-ranking foreign customer for this class of merchandise of United States origin, according to the Electrical Division, Department of Commerce. Exports of electrical equipment from the United States to Brazil markets have been increasing during recent years and advanced from a value of $5,542,000 in 1936 to $7,854,000 in 1938. With the exception of radios and refrigerators, most of the electrical equipment entering into the American export trade with Brazil has been of an industrial type such as to meet the needs of a country that is expanding its building and industrial activities as is this South American republic. Comparatively high-priced American merchandise is at a disadvantage with cheaper foreign goods, particularly those of German manufacture.

The report says there is, however, evidence in Brazil of an increasing resistance to Germany's barter system and use of compensation marks and a desire for less restricted trade with countries like the United States. In addition, the price advantages enjoyed by German merchandise are offset by the popularity of American goods. This week the war threatened to block shipment of all German goods to Brazil.

MACHINE TOOL DEVELOPMENTS PROCEED APACE

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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FOR the first time, bar stock up to 1½ in. diameter may be roll threaded without any limit as to length of thread. The machine by which this is accomplished is the new model XR roll threader just announced by the *Acme Machinery Co.*, 4533 St. Clair Avenue, Cleveland. Contrary to the practice in conventional roll threading equipment, the work is held stationary while the die rolling head revolves, permitting the stock to lead through the die head. Length of thread is limited only by the length of the bar, but the process lends itself especially to long, cumbersome bars.

Pitch diameter and lead are held within thousandths and the form of thread is said to be extremely accurate. The action of the rolls used in the head imparts a burnishing action to the thread surface, and besides giving a superior finish, improves the hardness and strength through cold working. Because pitch diameter stock is used, there is a saving of 15 per cent or more in material over what would be needed for cut threads. Depending upon the material and the kind of thread being rolled, speed of production is correspondingly higher by 15 to 50 per cent.

In appearance, the model XR machine is similar to the Acme XL thread cutting machine, except that rolls are substituted for chasers in the head. The Acme feature of micrometer adjustment of the head for controlling pitch diameters without stopping rotation of head is retained. Drive is by V-belt from motor in bed, with friction clutch for spindle control. A gear box gives eight spindle speeds. This unit is made in both single and double spindle types.

MOST of the machine tool design advances reviewed in these pages were developed in connection with the National Machine Tool Builders Show, originally planned to be held in Cleveland, Oct. 4 to 14. Although events abroad forced the cancellation of this show, the gains made in cost reducing factors, increased productivity, ease of operation and adaptability to a wider range of work have not been lost. These new machines are placed at the disposal of the metal working industry at a time when new demands upon its productive capacity undoubtedly will be made in the very near future.

Vertical Boring Mill

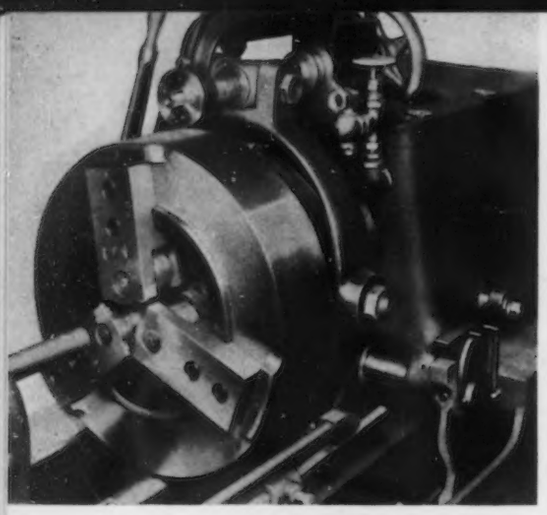
THE *Cincinnati Planer Co.*, Cincinnati, has developed a 6-ft. vertical boring mill equipped with two rail heads and one side head. The machine is completely motorized and swings work 76 in. in diameter and 60 in. high. The table may be driven through a 30-hp. constant speed a.c. motor through a 16-speed transmission, or through a variable speed d.c. motor with four mechanical speed changes provided, giving a range of table speeds of 1.3 to 50 r.p.m. Each head has 12 mechanical feed changes, ranging from 1/96 to 0.8 in. per rev. of table. A 5-hp. motor is used for elevating the rail and separate 2-hp. motors are built in for rapid traversing the heads along the rail. Lubricating oil and coolant pumps are also driven separately. The main drive motor is interlocked through an oil pressure switch with the oil pressure motor, making it impossible to run the table without the selected lubricant pressure.

The cross rail is of box form and is provided with a long guide bearing on the bottom, insuring alinement and preventing tilting and binding of the head. Cross and down feeds in rail heads have ratchet handles with micrometer dials for fine adjustment. Hardened steel scales are built in on the cross rail and rams. Free movement of saddles is assured by hardened rollers. Rams are also of box section and are made of Meehanite iron with an exceptionally long bearing. Tool holders are solid steel forgings, and a dual counterbalance is furnished so special heavy tooling can be attached to one head without the other head creeping. Both heads and rams are automatically lubricated at every 6 in. of movement.

The side head is supported by a saddle on the outside of the housing, permitting distribution of all stresses over the entire housing.

Gear Finishing Machine

HIGH speed reciprocation of the serrated tooth cutting gear and the use of either the crossed or the parallel-axes method of shaving are employed in the No. 18 gear finishing machine recently placed on the market



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AT LEFT

A ROLLED thread in any length on bar stock up to 1½ in. in diameter can be produced on the new Acme model XR roll threading machine, which is similar in appearance to the Acme XL thread cutting machine.

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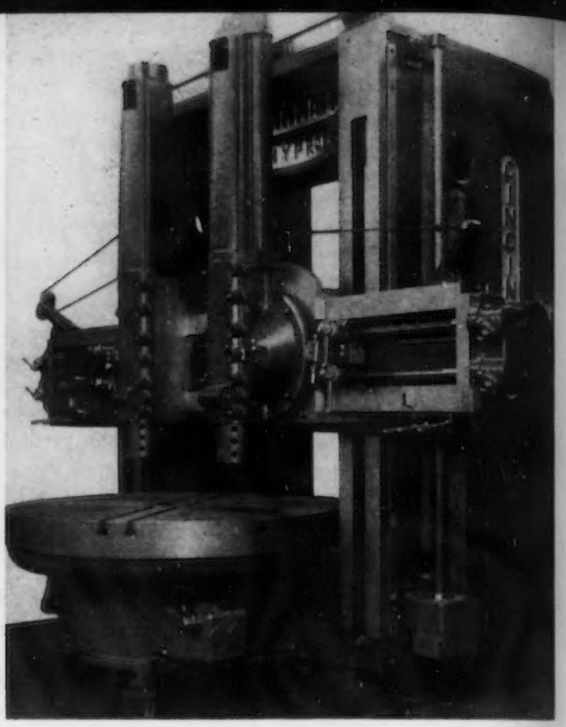

THE new Cincinnati 6-ft. Hypro planer, shown with round rams, can also be furnished with octagon rams for special deep reach work. A side head, not shown, is also regularly supplied.

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EXTREMES in sizes of broaching machines made by the American Broach & Machine Co., Ann Arbor, Mich. The large machine was recently furnished for contour broaching of rifle receiver forgings. This double ram unit with dual receding tables indexed by a modified Geneva motion has an overall height of 14 ft. and a nominal floor space of 8 x 8 ft. It is intended to be set in a pit and for this reason a chip conveyor is furnished to handle the large volume of chips produced. In contrast is the little machine at the right, fully equipped with Sundstrand hydraulic pump, four way valve, relief valve and sliding hydraulic cylinder. It has a stroke of 8 in. at a speed of 30 ft. per min.

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AT RIGHT

GEAR teeth can now be crowned on the standard Red Ring gear shaving machine equipped with a special table having a fulcrum in the center and actuated by an adjustable cam slot at the left end.

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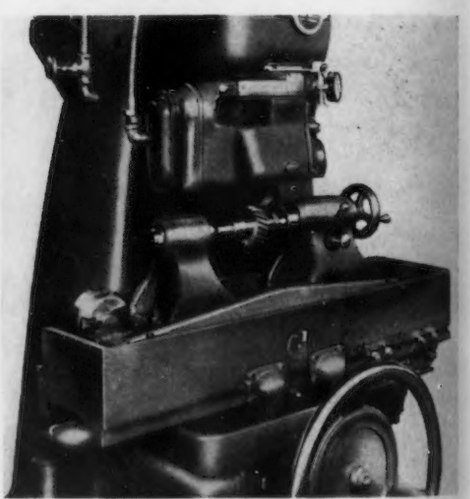

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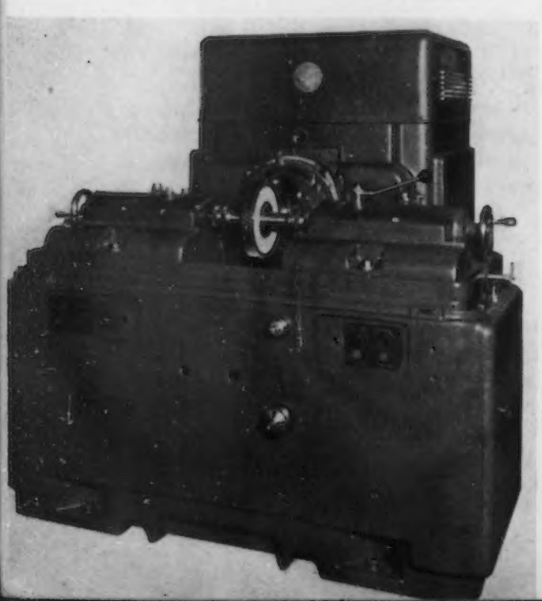
BELOW

A SERRATED toothed helical gear cutter is used for finishing a shoulder or cluster helical gear by the parallel-axes method on the Fellows No. 18 gear finisher.



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FELLOWS No. 18 gear finishing machine for external spur and helical gears is adaptable for both crossed-axes and parallel-axes methods of gear shaving.

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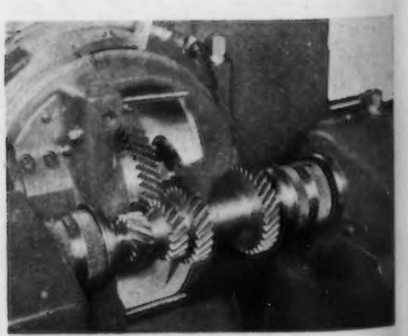

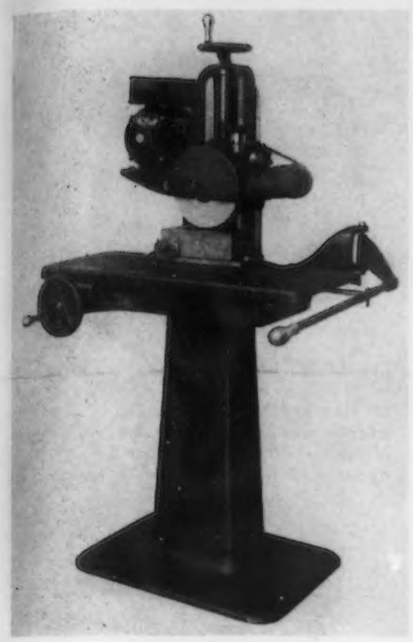

AT RIGHT

LANDIS type H plain hydraulic grinder has been developed for rapid production of small parts up to 1½ in. in diameter. This is the 4 x 12-in. size.

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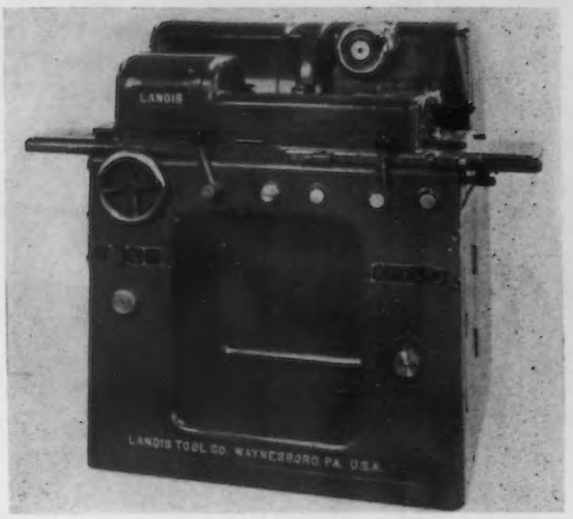
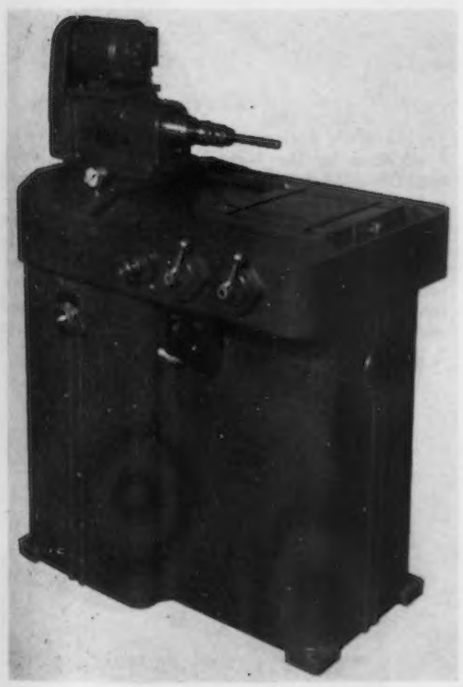


AT LEFT

FOR odd-lot grinding of small parts, Builders Iron Foundry has developed this utility surface grinder with both cross and longitudinal hand feed to the table.



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AT RIGHT

FOR fine drilling of holes with No. 80 (0.0135 in.) drills and smaller, the High Speed Hammer Co., Inc., 331 Norton Street, Rochester, N. Y., is offering a super-sensitive drilling machine with a table that can be fed up to the drill by spring pressure while the spindle is locked in position. For drilling larger holes up to ¼ in., the table is locked and the spindle assembly is traversed on the column in conventional manner. Standard spindle speeds range from 750 to 6000 r.p.m.

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ABOVE

SUBSTANTIAL stock removal, uniform diameter size, low tolerance accuracy and final finish approaching true planar smoothness are claimed for the new Micromatic Hydrohoner for small diameter bores, or external surfaces where the work can be rotated. A multi-directional travel path of the abrasive is a feature.

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AT LEFT

COMPLETE control of all cycles on Sundstrand Stub lathes may be had by adjustment of dogs on a disk, the edge of which is graduated to enable the operator to set up cycles quickly. For the cycles most frequently used three dogs are furnished as standard equipment. Other special dogs are used in additional combinations for more intricate cycles.

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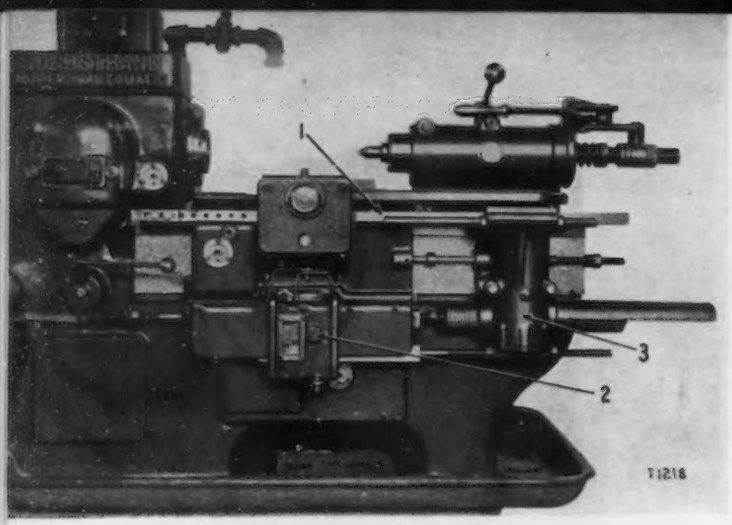

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AT LEFT

WIDE range of action of front carriage tools is provided by three units which can be used separately or in combination. Unit 1 controls angular feed-in and tool relief; unit 2, slow-up and dwell, and unit 3, straight feed-in and tool relief. This is the model 8 automatic Stub lathe.

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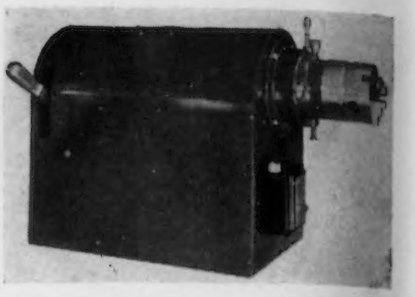
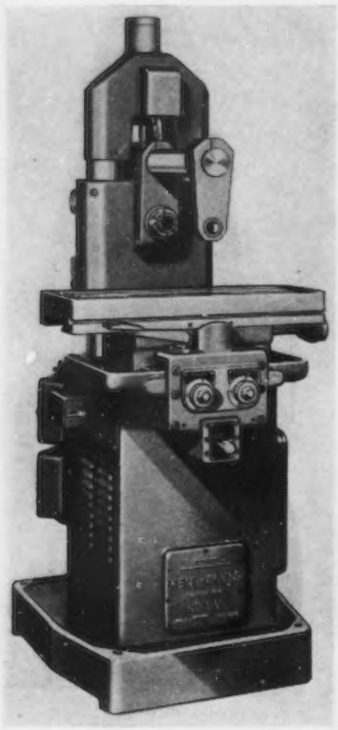


BUILT for bench mounting, the type VAIB Ideal variable speed lathe has an overall length of 26½ in. Speed changes are effected through vari-pitch sheaves by means of the hand lever at left, giving a ratio of approximately 6.8 to 1 with a single speed motor.

BELOW

AUTOMATIC vertical head feed on the Kent-Owens No. 1-V milling machine makes this unit especially adaptable to the milling of Woodruff keyways, cutting-off operations and milling tongues and slots in the ends of long shafts.



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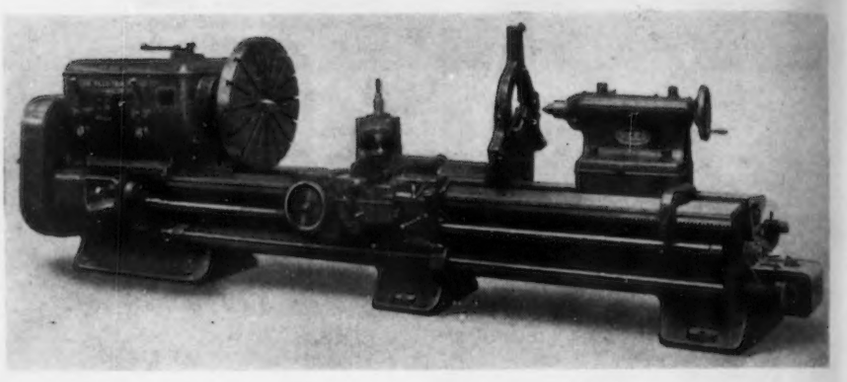

ABOVE

IN the newly designed 30-in. Time Saver lathe announced by the Niles Tool Works Co., Hamilton, Ohio, all headstock gears are hardened and ground and the machine is equipped with anti-friction bearings throughout. Positive fine tooth clutches are employed so that the feed can be thrown out instantly. There are 48 feeds available, ranging from 1/64 to 1 in. and spindle speeds range from 3.94 to 232 r.p.m. Drive is through multiple V-belts from a motor mounted on an adjustable base at the rear.

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AT RIGHT

CAM controlled automatic vertical feed of the spindle head is a feature of the new MM-52 Multi-Miller recently placed on the market by the U. S. Tool Co., Inc., Ampere, N. J. By synchronizing this vertical feed with the cam controlled table feed, the machine can be used for profiling operations. Typical cycle is: quick approach to cutting position, cut at one level, cut vertically to second level, cut at second level, raise spindle to clear and quick return to loading position. Any contour within the range of 2 in. vertical motion and 6 in. table movement can be milled. Drive is by a 1-hp. motor.

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AT RIGHT

THE Van Norman Hand-Mill is precision built for greater accuracy. Six spindle speeds from 160 to 1100 r.p.m. can be readily selected and belt tension is maintained regardless of cutterhead position. Rack and pinion table feed is hand controlled from front or back and table stops are provided with micrometer adjustment. Vertical cutterhead movement has positive control. Table has working surface 26 x 6 in. Slides all have hand scraped surfaces and adjustable gibs and locking binders.

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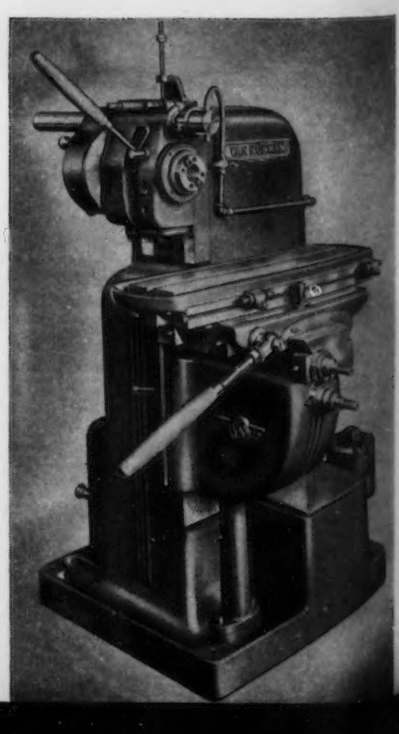

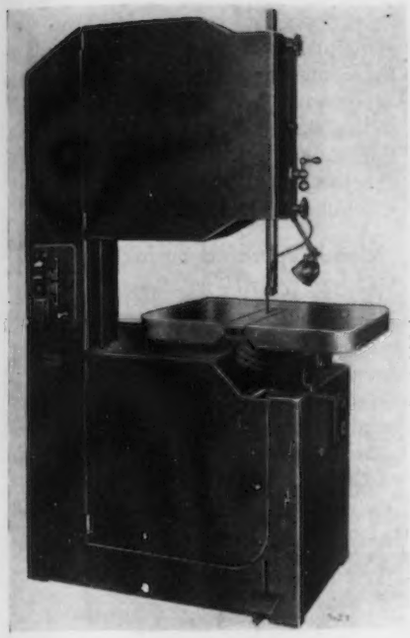

ABOVE

IN the Grob NS-24 combination machine, the pulleys have separate tracks for saw blade and file chain for quick change from one type of work to another.

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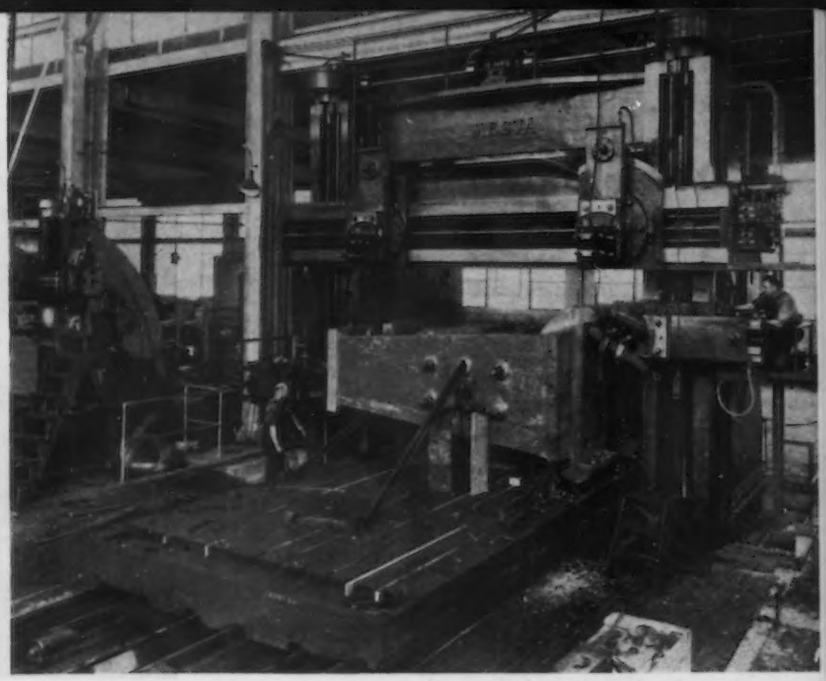
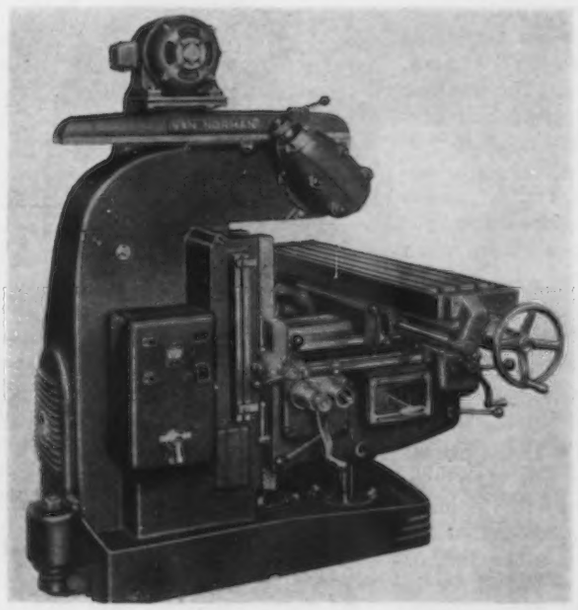
COMPRESSED air operating through the small cylinder shown at the bottom of the column at the right actuates the tapping head in both the drive and the reverse directions in this new Procunier tapper. Compensating springs assure uniform tapping pressure.

AT RIGHT

TO facilitate the machining of large parts in the building of large size steam hammers, such as the frame of a 50,000-lb. steam drop hammer shown on the bed, the Erie Foundry Co. has installed this huge planer, built by the Mesta Machine Co., Pittsburgh. Of conventional double housing type, the machine has a clearance of 16 ft. 6 in. between housings and 14 ft. 3 in. from the table to the underside of the rail. Table length is 35 ft. 10 in. Total weight of planer is nearly 450 tons. Table alone weighs 100 tons and is driven through two racks, one on either side of the middle V-way. Speed range is 3.2 to 96 ft. per min. and table drive is by a 75-hp. motor. Individual electric feeds are provided each head, and pneumatic tool lifters are used on the return stroke of the table. Individual castings weighing up to 200 tons can be handled on this machine.





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AT LEFT

PARTICULAR attention has been paid to rigidity, convenience of control and adjustment, accuracy and modern appearance in the new No. 26 Van Norman ram type head universal milling machine.

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AT RIGHT

TOTAL time required to Superfinish an 11-in. brake drum, previously finish bored, is approximately 15 sec. on this special brake drum Superfinisher, made by the Foster Machine Co., Elkhart, Ind. In the first part of the cycle, the roughing stones are automatically drawn into the surface under adjustable spring pressure. Later in the cycle they are withdrawn and finishing stones complete the remaining few seconds of the operation. Finally these stones withdraw and the spindle is stopped. Drums are finished to a profilometer reading of 10 micro-in., considered satisfactory for this type of service, although a finer finish can be obtained by varying the cycle of operation.

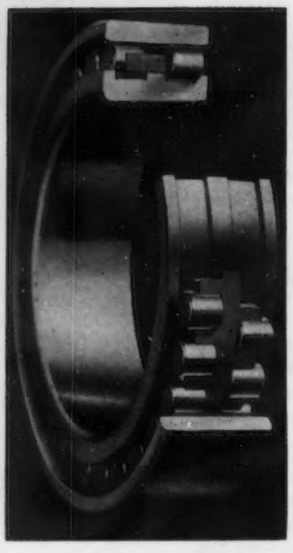
by the *Fellows Gear Shaper Co.*, Springfield, Vt. The result of high speed reciprocation is said to enhance the cutting action, speed up the work and give a better finish since there is less burnishing action than in the case where the rotary finishing tool is slowly traversed across the work in the conventional manner. The parallel-axes method is advantageous in the finishing of shoulder or cluster gears. When employing this method, a spur tool is used for spur gears and a helical gear for helical gears. One tool can be used for finishing gears with a large range in numbers of teeth as long as they are of the same tooth proportions. For the crossed-axes method, the cutting tool can have either straight teeth or helical teeth, depending upon the direction of the teeth on the gear relative to the gear axis and the necessary crossed-axes setting required for best results.

The machine is provided with complete electrical control. The finishing tool is advanced toward the work by means of a feed cam, and through the electrical control, the required number of reciprocating cycles can be set depending upon the diameter of work, pitch and other factors. The machine is substantially constructed and carries two slides for headstock and tailstock spindles, also an angularly adjustable head for the cutter spindle. The machine has a capacity for spur and helical gears up to 18 in. pitch diameter and 5 in. face.

Plain Hydraulic Grinder

THE *Landis Tool Co.*, Waynesboro, Pa., has developed a new type H plain hydraulic grinder in two sizes, 4 x 12 in. and 4 x 18 in., primarily intended however, for high production work on parts up to 1½ in. in diameter. It is a low machine that can be operated either from a standing or a sitting position as the bed is deeply recessed in front. The machine may be used for either traverse grinding or infeed grinding by manipulation of a selector control in the hydraulic circuit. When the machine is set for straight infeed grinding, the wheel base comes into the grinding position without table traverse movement and grinding proceeds with the usual slow feed; when set to traverse grind, the wheel base comes into grinding position and the table traverse starts simultaneously.

A feature of the hydraulic system used on this machine is the use of a pressure regulating unit that compensates for variations in oil viscosity, thereby insuring uniform traverse movement regardless of changes in oil temperature. All electrical and hydraulic controls have been interlocked so as to save operating effort.



REQUIREMENTS said to be met by the SKF double row cylindrical roller bearing developed for machine tool spindle application are: rigidity of the spindle and of the bearings, both radially and axially; accurate running with minimum temperature changes under varying conditions of load and speed, and practical elimination of wear.

Drive of the headstock is by multiple V-belts from an adjustable feed motor, with controls arranged for either a.c. or d.c. line current. Speed range is from 200 to 900 r.p.m. The wheel spindle is also driven through V-belts, and cone pulleys are used to increase the spindle speed as the wheel wears. Spindle bearings are of the spherical self-aligning type, made of babbitt lined steel. Bearing clearance may be readily changed or duplicated by means of a micrometer adjustment.

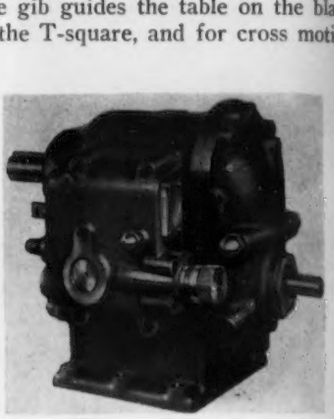
Gear Crowning Attachment

CROWNING of gear teeth has been found to be effective in eliminating noises due to end contacting of gear teeth as a result of small errors in shaft parallelism. Furthermore, gears that in heat treatment exceed the distortion allowed for in crowning can be corrected by lapping much more quickly than uncrowned gears because of the restricted surfaces involved. Not to be confused with chamfered gears, crowned teeth are barrel shaped throughout their length, usually being thicker at the middle or any other selected point by 0.001 in.

To produce a crowned gear tooth, a special table has been devised for use on the standard Red Ring gear shaving machine made by the *National Broach & Machine Co.*, Detroit, a unit operating on the crossed-axes principle. The table has a fulcrum in the center and the amount of crown is determined by the angularity of setting of a cam slot at the end. When this cam slot is parallel, the machine generates conventionally shaped teeth without a crown.

Hand Operated Surface Grinder

A UNIQUE T-square action is used for hand actuation of the table on a small utility surface grinder developed by *Builders Iron Foundry*, Providence. For longitudinal motion by handlever, a ground slot with adjustable gib guides the table on the blade of the T-square, and for cross motion by handwheel a similar slot in the bed serves as a guide for the cross head of the T-square, which carries the feed nut. Except for this slot, the bed is a flat ground surface. Bearing surfaces are protected from dust by a large apron on the table. Unusual accuracy is claimed because there is but one oil film subject to grinding pressure.



SUITABLE for either speed or feed drives for machine tools, this 2-hp. oil power variable speed transmission, made by the Sundstrand Machine Tool Co., Rockford, Ill., has a stepless speed range from 10 to 3000 r.p.m. Having a multiple piston pump mounted below a hydraulic motor of the same type makes a very compact arrangement. Controls are simple and flexible. No valves are used in reversing and there are no rotary valves. The unit is said to have high overall efficiency, with high starting torque at low speeds. It is suitable for a wide range of industrial applications as well, since either mechanical, hydraulic or electrical remote controls can be provided.

For the vertical movement of the head there are two adjustments, a rough one on the column by handwheel and a micrometer adjustment of the spindle housing about a fulcrum point on the saddle. The weight of the pivoted motor acting through the single V-belt holds the housing against the adjusting screw, eliminating backlash. The spindle itself is

equipped with a tapered bronze bearing at the front and a ball bearing at the pulley end. Capacity is for work 8 in. long by 4 in. wide, and a magnetic chuck of this size can be supplied. A ¼-hp. motor is standard.

Small Honing Machine

THE new Hydrohoner announced by the *Micromatic Hone Corp.*, Detroit, is said to achieve a high degree of efficiency of hone abrading action as a result of a new combination of stone and work motions. A unique form of swash plate action is used to obtain a very rapid, odd-ratio reciprocating motion of the spindle as related to its rotation, while the work is slowly reciprocated through its relatively longer work stroke. These motions produce a multi-directional travel path of the abrasive which assures uniform abrading effort and free cutting action resulting in removal of substantial amounts of stock rapidly and economically. Accuracy within a few ten-thousandths of an inch for roundness and straightness is easily obtainable in production and surface roughness can be held within 5 micro in., r.m.s. value, starting from ground surfaces on hardened parts or reamed or precision bored on soft steel, cast iron and some non-ferrous metals.

Proportionate, continuous feed or expansion of the stones is maintained by an hydraulic piston which feeds in relation to stone wear as bore enlargement occurs. Working pressure is adjustable and microscopic increments of expansion or feed adjustment may be made manually, ranging upwards from 0.00005 in. per stroke, according to the diameter. The work is chucked in a special fixture mounted on the hydraulically actuated work table. Range of stroke provided on standard machines is ½ to 8 in. for the table, and 0 to ½ in. for the spindle. The cycle comprises movement of the table from the loading into the working position, starting of spindle rotation and reciprocation, and automatic expansion of hone in bore. Reversing the operating lever causes the stones to contract, spindle movement to stop, and the table to withdraw.

Hone bodies are available for every 1/32 in. increase in bore diameter. Abrasive sticks are mounted in simplified stone holders and the hone bodies are arranged with ball retaining mechanism for quick interchange. The spindle is of replaceable cartridge design and is carried in anti-friction bearings. Spindles are V-belt driven.

MODEL No. 11023-E Ruthman submerged suction coolant pump has twin suction intakes and a hydrostatically balanced impeller.

Automatic Lathes

SINCE the first model 10 automatic Stub lathe was exhibited in 1935 by the *Sundstrand Machine Tool Co.*, Rockford, Ill., the model 12 and model 8 sizes have been introduced and the entire line improved during the four years. Emphasis is placed on the ease of change-over for short-run turning operations, as exemplified by the use of three standard dogs and three special ones on a single disk plate for controlling all cycles. The machine is equally effective for long run work. Adaptability of the front carriage tools is enhanced by the use of an angular feed-in unit consisting of cam bars; also a tool relief that moves the tools away from the work at the end of the cut; a slow-up and dwell attachment for shoulder work or when cutting into forging drafts; and a straight in-feed, providing rapid traverse and feed to the carriage at right angles to the centerline of the work. The rear slide can also have angular feed-in and tool relief attachments. This slide has longitudinal adjustment on the bed and its transverse position can be shifted easily, final adjustment being by means of a micrometer dial.

Spindle is extra-heavy alloy steel, bored for draw rod and threaded at the rear for hydraulic or other chuck operating mechanism. Standard spindle mounting is precision roller bearing, but bronze bearings, with ball thrust, can be had. Tailstock is massive and is provided with a broad base, double gibbed. Quill is hardened and ground and is carried in a honed bore. It may be operated by lever, screw, air or hydraulic actuation. Front carriage and rear slide are closely fitted to pressure lubricated, hardened steel ways, protected by wipers.

Model 8 is supplied in lengths of 15, 21, and 28 in. between centers; models 10 and 12 in 16, 22 and 34 in. between centers.

Variable Speed Lathe

TYPE VA1B Ideal variable speed lathe is a bench chucking unit for use in grinding, lapping, filing and polishing. The unit, made by the *Schauer Machine Co.*, 2060 Reading Road, Cincinnati, is totally inclosed and is equipped with a standard motor. Variations in spindle speed are accomplished by the use of a variable pitch pulley, the range of variation being about 6.8 to 1 with a single speed motor, and 14 to 1 with a two-speed motor. Top speed is 6350 r.p.m., low speed 75 r.p.m. Speed changes are made by a hand lever while the motor is running. Standard equipment includes an automatic brake and a three jaw universal chuck. There is a 1-in. hole through the spindle. A thermal switch and overload relay are standard electrical equipment. Motors can be supplied for any voltage or frequency.

Ram Type Universal Millers

A RAM type miller in two sizes, known as the No. 26 and No. 36, has been developed by the *Van Norman Machine Tool Co.*, Springfield, Mass. The ram is larger and heavier than in previous designs and it carries a new spindle transmission with heavier gears mounted on ball bearings. A speed change unit provides 18 changes of spindle speed from 30 to 1500 r.p.m. in geometric progression. The cutter head is materially larger and is locked to the ram in either a horizontal or a vertical position by means of four bolts. Final drive to the spindle is through ground spiral bevel gears. A ram type overarm, 43 in. long, provides rigid outboard support for cutters and attachments.

Ample bearing surface for carrying the massive knee on the column has been provided with double angle, wedge type gibbing, with gib clamps operated by a single lever. The bearing for the saddle is broad and long and has square ways with taper gibs. The knee contains the feed change transmission unit, operated through a vertical splined shaft from the driving motor located in the column of the

(CONTINUED ON PAGE 119)

THIS WEEK ON THE ASSEMBLY LINE

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By W. F. SHERMAN
Detroit Editor

o o o

. . . Automobile companies enter orders for steel as war creates a new situation . . . Canadian automobile plants probably will be busy on war orders, especially trucks . . . Assemblies moving upward.

DETROIT—The quick rise in prices of non-ferrous metals and some other commodities immediately following the outbreak of war in Europe brought a substantial buying wave in the Detroit area from automobile, accessory and parts manufacturers. In addition to new steel purchases, the automobile industry endeavored to specify as fully as possible against its low-priced commitments for sheets and strip of last May.

The sudden wave of activity was clearly reflected in the work which piled up at once in Detroit offices of the steel companies. Most of them were obliged to work staffs overtime to handle the orders.

Greater emphasis in this wave of buying was placed on miscellaneous types of steel, rather than on sheets. There was some fear that greater demand for steel might make prompt deliveries of some products difficult later on.

Canadian Plants To Be Busy

During the week automotive eyes turned across the river to Windsor and Oshawa, Ont., where the bulk of the Dominion's automobile manufacturing is concentrated. Windsor, in fact, is the largest point of automobile production in the entire British Empire. Speculation was whether these plants would immediately turn over to war material. It was unofficially reported from Oshawa that some realinement of normal manufacturing ratio at the General Motors plant there had already been noted in favor of added output of trucks—a prime war requirement. Trucks were also reported to be in process of manufacture at Chrysler's Dominion plant at Windsor. Ford assembly operations on both sides of the Detroit River were in preliminary stages this week, a start being scheduled for next week.

Meanwhile, other repercussions of the war were also noted at Detroit. Along the Great Lakes nearly frantic efforts are being made to commission idle ore carriers to bring down cargoes from Lake Superior before the freeze-up of the Soo Locks in late November or early December. Latest reports were that 15 added freighters have been called into service since late in August, whose activity will augment the ore fleet to 218 boats. There are 302 such vessels on the lakes.

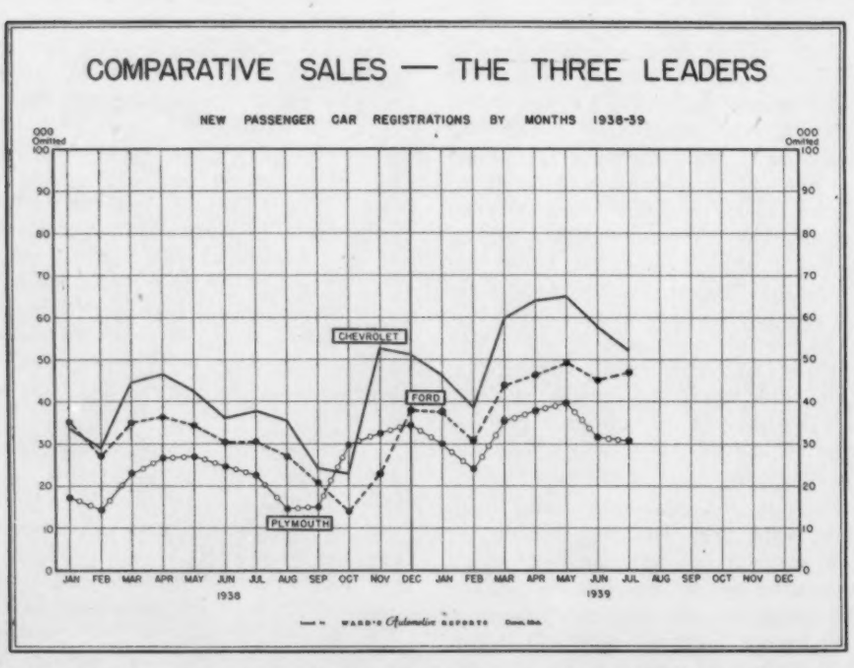
Assemblies Gaining Slowly

Last week's automobile production, according to Ward's Automotive Reports, was 26,865 cars and trucks in all United States and Canadian plants, against a revised total of 24,240 in the previous week and 17,485 at this time last year. Ward's pointed out that the gain was achieved despite the loss of working time on Labor Day, and that last year Labor Day week reflected a drop from the previous figure.

Of the total production, the best advance was registered by the Chrysler divisions, which completed 10,425 vehicles against 7025 the week before. General Motors plants were up to 7750 from 6173. Ford remained in subassembly operations, with starts in some branch plants carded for this week.

Strikes Curtail Parts

Less optimistic notes in the production picture were the shutdowns at the Packard plant Wednesday night and the Nash plant Thursday night, throwing about 17,000 Michigan and Wisconsin workers out of their jobs because of the Bendix strike in South Bend. Both companies ran out of brake parts made by Bendix, and other manufacturers were believed to be


COMPARATIVE SALES — THE THREE LEADERS
NEW PASSENGER CAR REGISTRATIONS BY MONTHS 1938-39
000 Omitted
CHEVROLET
FORD
PLYMOUTH
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1938
1939

THIS chart of passenger car sales of the three leading makes shows how definite is Chevrolet's margin this year over Ford and Plymouth. In an earlier period, as can be noted, the competition was much closer. Registration figures show that Chevrolet is first in sales in all states of the union except Michigan, which remains true to its Ford preference tradition.

TO THE RESCUE OF STALLED

PRODUCTION LINES COME

BARNES-MADE SPRINGS SMALL

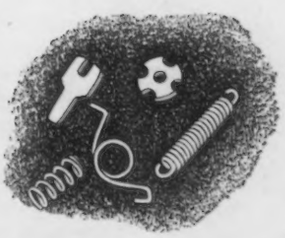
STAMPINGS WIRE FORMS

ACCURATE TO SPECIFICATIONS

SAVING INSPECTION DELAYS

MEETING YOUR TIME SCHEDULES

GET A BARNES QUOTATION

ON YOUR  PRODUCTION PARTS

WALLACE BARNES COMPANY

BRISTOL CONNECTICUT

DIVISION OF THE ASSOCIATED SPRING CORPORATION

FOR 1940, Plymouth's floating power engine is being "superfinished" to make vital parts virtually immune to wear. This view shows the careful profilometer check on cylinder boxes, to hold inside smoothness perfect within four one-millionths of an inch.

o o o

skirting edges in their supply of these requirements.

At the same time, word came out that the strike at the Bohn Aluminum & Brass Corp. would shortly curtail airplane engine output at Pratt & Whitney and Curtiss-Wright, both of whom depend on Bohn for bearings. The absence of a large-scale production resumption last week at the General Motors Truck division at Pontiac was also said to have been due to lack of bearings.

Settlement of the Bendix strike in the early hours of Monday morning enables automobile plants affected to make plans to return to work by midweek. Packard and Nash are principally affected. However, it has been learned that anxiety regarding the settlement of Bendix strike was aroused by the fact that Bendix is an important supplier for aircraft companies in military production.

Dealers' Sales Promising

The tieups in Packard and Nash production came as both these producers were facing what appeared to be a very promising initial market for new models. Large-size dealer orders are piled up on the books of both companies. In the case of Packard, whose models have been on sale, dealers have been unable to make all desired deliveries because of the inability of output to equal the order bank.

Such auspicious starts of the 1940 model year, incidentally, have not been the exception. Dealer reports generally have indicated a substantially greater interest in forthcoming cars this fall than was the case last year.

Seasoned observers of the industry predict that such demand will receive powerful amplification in the weeks immediately ahead when retail salesmen begin to point out to their prospects that higher raw material and commodity prices, much publicized in the past fortnight, may well be translated into higher delivered prices for cars some time during the model year. Buying as a hedge against higher car prices was an important factor in the 1936-37 sales advance, and may be so again. Certainly the salesmen will use it as a weapon in their selling drives.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WILL YOU PLEASE GIVE THIS TO MY HUSBAND WHO IS ON LATHE TEN IN ROOM FOUR — AND THANKS A LOT
IF YOU JITTERBUGS WOULD LEAD A NORMAL LIFE, THIS WORLD WOULD BE A BETTER PLACE FER TH' REST OF US TO LIVE IN — I'M A WATCHMAN, NOT A BUTLER, MESSENGER AND VALET! NOW, DON'T ASK ME TO COME OVER AND WASH TH' WEEK'S DISHES
ONE MAN AIN'T ENOUGH FER THESE MODERN GALS — THEY NEED FIVE ER SIX
YEH, WE'D BETTER GIT OUTA HERE — SHE'S GOT A FLAT TIRE OUT THERE — LET HER GIT A COUPLE PASSERSBY
COPR. 1939 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
THE LATE RISER
J.R.WILLIAMS 9-8

Soaking Pits Are Improved by J. & L.

PITTSBURGH—In order to increase soaking pit capacity, as well as improve heating quality, Jones & Laughlin Steel Corp., at its Aliquippa works, has practically completed an expansion program involving their regenerative producer gas-fired soaking pits.

The pits have been lengthened, thus providing for greater pit capacity as well as permitting longer heating time with better soaking of the ingot.

Old style covers have been replaced with new ones permitting closer sealing at the top of the pit and featuring suspended cover brick. This latest change assists in eliminating air infiltration to the pit.

Judging of temperature by eye has been eliminated with the installation of recording pyrometers in each pit. Signal lights are provided to warn operators should the predetermined temperature be exceeded.

Automatic control of furnace pressure, in order to maintain a uniform positive pressure in the pit, has been installed. This action has resulted in lower scale formation and greater uniformity in soaking practice. In order to reverse the firing of the pits at uniform intervals, automatic time clocks have been installed, which make possible more rapid reversal than occurred under the older manual methods.

Jones & Laughlin has studies now under way centering around the replacement of the present bituminous producer gas fuel, with a clean, low B.t.u. gas fuel. The adoption of the latter would permit additional improvement through the use of automatic control of furnace atmosphere and automatic temperature control.

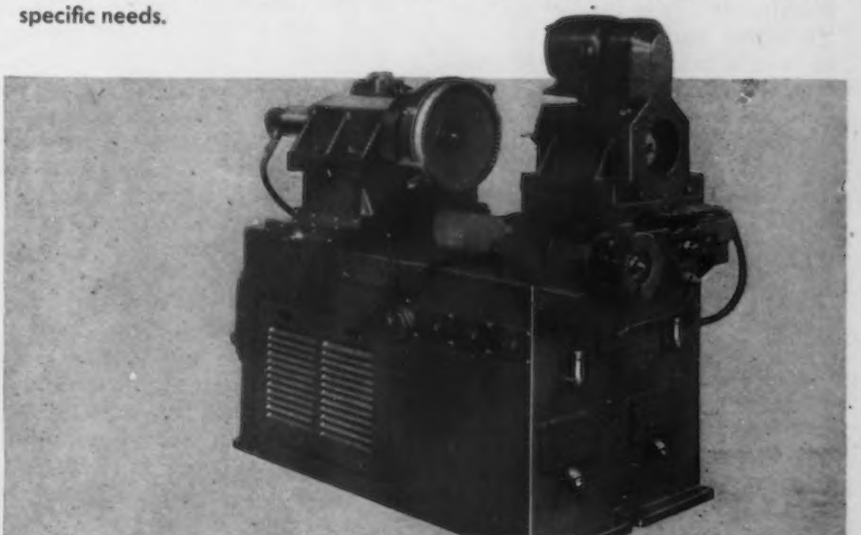
Aluminum Research Laboratories Expanded

PITTSURGH — Greater facilities for research in aluminum will be available following additions now being made to the Aluminum Research Laboratories at New Kensington, Pa. The building program will include a two-story addition to the largest testing laboratory for the purpose of housing a new testing machine, a one-story extension to the present shop building, and a three-story extension to the main building. The increase in floor space will amount to 15,000 sq. ft., and will bring the total laboratory floor space to 71,000 sq. ft.

BURRS GEAR TEETH

around entire profile

THE Cimatool No. 201 A, Contour Burring Machine, automatically burrs the ends of gear teeth around either a part of, or their complete profile, top, sides and root. By thus eliminating all sharp corners such gears are easier to assemble and are free from the hazard of crystalization and chipping in service—extremely important under all high speed operating conditions and especially so in aircraft engines. • This machine is designed to process either internal or external gears and both faces of the teeth. On some internal gears this Cimatool machine burrs the rear face of gear teeth adjacent to the wall of a blind hole. This and many other applications are typical of its unusual possibilities. • In addition to the No. 201 A, the Cimatool line of burring and chamfering machines includes ten other models, one to satisfy practically any requirement in this field of gear processing. • Write for data on your specific needs.



THE CIMATOOL COMPANY

Dayton, Ohio, U.S.A.

DIEMAKERS • MACHINE TOOLS • TOOL MAKERS

THIS WEEK IN WASHINGTON

. . . Washington takes on pre-war atmosphere . . . Roosevelt to call special session . . . New Deal holds building industry provides key to recovery . . . Applications for WPA projects totaling nearly $2,000,000,000 are returned.

By L. W. MOFFETT
The Iron Age

WASHINGTON — Washington has taken on a distinctly pre-war atmosphere. Activities of the Government from the White House down through the Departments, Bureaus, and branches are emphasized with the overtone of "if and when." The rapid Administration moves impelled by the outbreak of war in Europe do not take on the air of hysteria. As always has been the case in similar curcumstances wholehearted response has been made to the President's appeal for "National Unity" though there is some complaint that the situation is being unduly dramatized. In any event the Administration reflects an overwhelming public sentiment in seeking to keep the United States out of the maelstrom. At the same time the Administration is acting swiftly to insulate the country from a war if possible, or if not, to have it prepared if it should become a belligerent. Domestic problems are overshadowed by the war situation.

Arms Embargo Repeal First

The latest front on which the White House has moved is the determination of the President to call a special session of Congress for the purpose of repealing the Arms Embargo Act. At this time (Tuesday) the call for the special session had not been issued but it was expected soon.

It is the hope of the President that lifting of the ban against exports to belligerents of arms, munitions and implements of war will be readily voted by the Congress. Nevertheless, there are indications that a stiff minority opposition will brace itself against repeal of the act. It may even be expected that certain groups will seek to broaden the embargo so as to include pig iron, steel, scrap, oil, etc.

However, the Administration thinks public sentiment favors repeal of the embargo act and hopes it can be quickly accomplished. The Administration has greater assurance of repeal than it has of rapidity of such action.

Will Help England, France

The Administration is anxious to have the Embargo Act repealed so that this country may freely ship arms, munitions and implements of war to any belligerent on a cash and carry basis in the bottoms of the countries purchasing the supplies. Manifestly repeal will be advantageous to England and France which have free access to the seas, except for the submarine hazard. At the same time Germany will be shut off from American supplies.

Canada's declaration of war disposed of unfounded conjectures that she would maintain a technical neutraity in order that she might be used as a backyard for transshipments of American supplies now embargoed to England and France.

Last Friday the President issued a proclamation of "Limited Emergency." It provided for substantial increases in the Army, Navy, Marine Corps, and National Guard, fortified the Government's powers to curb foreign propaganda, was designed to prevent sabotage and made available to the State Department a $500,000 contingency fund for the aid of the Americans abroad.

Prior to issuing this proclamation the President was careful to state that the expansion of the defense forces was in no sense a conversion of the country to war basis.

The President also has given orders for the repair of 116 World War destroyers and War Department plans for defending Porto Rico and the Panama Canal have been stepped up.

Other moves fitting into the pre-war activities were made. Among them was the setting up by the State Department of a special division to handle special war problems, the addition of more advisers to the Treasury Department to consider the matter of finance and the completion of an advisory council by the Department of Agriculture.

Also in the name of emergency the President issued an order from Hyde Park for reorganization effective on Monday of the present week of the White House executive offices. It set up new functions to be performed by first class men, so it was stated, thus throwing the "brain trust out of the window." There still is a suspicion that the "brain trust" will lurk in the nearby shadows of the White House.

Curb on War Profits Likely

Meantime it is known that legislation is being drafted or has been drafted ready to be offered, if necessary, to curb war profits though study is being given to the possibility of present administrative powers to do so.

As was published in THE IRON AGE of Sept. 7, the Department of Justice also is giving study to possible legislation to prevent peace-time profiteering. The President asked that the study be made. Whether or not a serious effort will be made for such legislation is not known. The administration appeared to be almost indifferent to the sharp boost in food prices.

Steel Prices Different

Prices of industrial products are viewed differently. While the administration has for the time withdrawn its blasts against industry and business generally, it does affect to be much concerned over a fear of war profiteering of important war supplies.

Reports that the administration was concerned over the steel price trend seem to have disappeared, at least for the present, in view of the fact that there has been no bulge in domestic prices while export prices have been merely lifted to domestic levels, it has not been indicated whether further increases would be frowned upon by the administration. The trade generally is understood to feel that moderate advances are necessary.

YOU Can't AFFORD to Miss IT!

Prominent Steel Engineers who attended last year's Convention.

Steel plant engineers and operators are prolific in their expressions of the interest and value of the Annual Convention and Iron and Steel Exposition of the Association of Iron and Steel Engineers. Many have stated that it is not possible to attend this gathering of steel plant men without accumulating numerous practical ideas that are applicable to their particular plants.

A complete coverage of steel mill practice will be found at the technical sessions—all of the latest designs and developments will be on exhibit in the Iron and Steel Exposition—two inspection trips to the Pittsburgh districts most modern steel plants—and at this convention you will find the leading authorities on modern steel mill operation.

Make your plans now to attend the

35th Annual Convention

and

IRON AND STEEL EXPOSITION

of the

Association of Iron & Steel Engineers

WM. PENN HOTEL, PITTSBURGH

Sept. 26 - 27 - 28 - 29, 1939

Brazil May Develop Own Steel Industry

WASHINGTON — Construction of a new electric railroad in Brazil between San Sebastian and a navigable section of the San Francisco River near Guahcuhy will soon be started, according to a report from the commercial attaché at Rio de Janeiro to the Department of Commerce. Mineral ores and iron products will be the principal items transported by the railway. The concessionnaires have agreed not to export ores in their natural state and to limit profits to 25 per cent on the iron and steel product handled.

CIO Wins Westinghouse Election by 574 Votes to 510

WASHINGTON — The NLRB has certified the United Electrical, Radio & Machine Workers of America, Local 724, affiliated with the CIO, as the sole bargaining agent of the hourly paid employees of the Lima, Ohio, plant of Westinghouse Electric & Mfg. Co. The board said its action was based on the results of a secret ballot election Aug. 18, when, of the 1135 ballots cast, 574 were cast for the UERMWA, 510 for Lima Westinghouse Employees Association, Inc., and 47 for neither. The board has dismissed the unfair labor practice complaint against Independent Pneumatic Tool Co., Aurora, Ill., and ordered its wholly-owned subsidiary, Cochise Rock Drill Mfg. Co., Los Angeles, to bargain, upon request, with SWOC.

ICC Suspends Cut in Pipe Rates From Memphis

WASHINGTON—The Interstate Commerce Commission has suspended until April 5, 1940, schedules proposing reduced rates on wrought iron or steel pipe and fittings in carloads from Memphis, Tenn., to destinations in central and southern Arkansas, northern Louisiana and northeast Texas. The following, in cents per 100-lb., is illustrative of the present and proposed rates from Memphis:

	Present	Proposed
El Dorado, Ark. ...	43	20
Shreveport, La.	50	23
Tyler, Tex.	59	28

British Steel Mills Operating at 95%

WASHINGTON—Reflecting the pressure of war demand, steel production in the United Kingdom reached its highest July output at 1,153,100 tons. The output exceeded by 94,000 tons the figures for July, 1937, which had previously held the production record for that month. Ordinarily there is a decrease of about 100,000 tons during July as compared with June due to shutdowns for repairs and holidays. This year, however, there was a decrease of only 22,500 tons. Production of pig iron in July of the current year was 743,600 tons compared with 715,700 tons in June.

While steel production was 22,500 tons less than for the previous month, the average daily rate of output was about 46,700 tons during July compared with 45,700 tons in June, a daily increase of about 1000 tons. With a calculated yearly capacity of about 14,700,000 tons the United Kingdom steel industry is now producing at about 95 per cent capacity, or about 14,000,000 tons annually.

DUST DID THIS

Nature Taught this Lesson—

YOUR PLANT CAN PROFIT BY IT

Proper control measures would have prevented the destructive dust storms on the Western prairies a few years ago. And proper control will keep the dust hazard out of your plant, too.

American "Dustube" Dust Collectors are designed to give you the efficient protection you need—and at a minimum of expense. Investigate them today. Write for Dust Control Book No. 22.

MADE IN SIZES FOR *Every* DUST SUPPRESSION PURPOSE

THE AMERICAN FOUNDRY EQUIPMENT COMPANY
510 S. Byrkit St. Mishawaka, Ind.

American DUSTUBE DUST COLLECTORS
BUILT TO THE MOST EXACTING STANDARDS

New Deal Holds to Belief That Building Is Recovery Key

WASHINGTON — Throughout the New Deal's seven years of inconsistencies it has clung tenaciously to the idea that a revitalized construction and housing industry is the key to economic recovery. Almost from its inception it established a slum-clearance low-cost housing program under the original PWA program. The old Rural Resettlement Administration spent $35,000,000 in building three model communities as a combination housing - work - relief project to sell private industry on developing low-cost housing communities. The Federal Housing Administration's job was to insure loans made by banks or existing loan agencies thereby stimulating home construction. Today with a building boom still on the other side of that elusive corner the Administration, facing its eighth and perhaps final year, still has a few white rabbits up its sleeve to break the housing log-jam.

High on the list is the $8,000,000 housing census authorized by the last session of Congress and pushed by all government agencies concerned with the subject of adequate housing. It will be conducted by the Bureau of the Census in conjunction with the 1940 census. Trust Buster Thurman Arnold, head of the Justice Department's anti-trust division, acting on the theory that building costs are too high, is proceeding with persecutions in four states against alleged "price fixing restraints", in the construction field. Commerce Secretary Hopkins has directed his "spark-plug" boys to work up a plan for inducing private capital to invest in low-cost housing. And the FHA has made effective a new long-term plan for financing the construction of homes costing not more than $2500.

What Census May Include

The housing census will be conducted while enumerators are still in the field but not simultaneously with other counts to be taken in the 1940 census. Officials have not completed all details, but information to be gathered will probably include the number of houses, number of rooms, number of occupants, the extent to which mortgaged, the rate of obsolescence and other data.

Like many other New Deal undertakings, the housing census will be a first-attempt project. It was mapped out originally by key men in government housing agencies who insisted that an adequate inventory is one of the missing links in the housing picture. Among the trade associations and business groups endorsing the census was the Metal Window Institute.

The Justice Department's plan to attack "price fixing restraints" by invoking provisions of the anti-trust law is based on the notion that building material costs constitute an insurmountable burden and act as "a brake on the general recovery of business." Whether Mr. Arnold follows through with his announced intention of proceeding against building trade unions remains to be seen, but he has been outspoken in his contention that the cost of building materials is not the

1939 VOL. LXXXVIII . . No. 29,779 Published Every Morning by The Tribune, Inc.

Seizes City Hall

Vote Form of County Posts

Latest Data Book Tells All About New Ball Bearing

Bearings Company of America Meets New Demand of Engineers and Machine Designers for Sea Ball Bearings With More Space for Lubrican

LANCASTER, PA.—Jack L. Straub, President of th Bearings Company of America, announced today that the ne ats Book soon to be issued by his Company would conta mplete engineering data for a number of ball bearings whic e completely new in design.

Among the new bearings are se eral of the Composition Seal ty These have been designed to meet t growing demand by mechanical en neers for seal bearings with mo space for the lubricating mate than has been provided by st bearings in the past. Recent develo ments in machine design, with t dencies toward higher operati speeds, have resulted in the need better lubrication of this type bearings. BCA is among the first the ball bearing industry to recogn this growing need for ample and u enduring lubrication in connec with the modern, approved, per sently sealed construction.

The Company has been making bearing of somewhat similar ty known as "Greased Lightning," the past few years. It has fo wide acceptance in metal and w working machinery, high speed machinery and other places w proper lubrication is an impor factor. It was the unusual acc ance and demand for this bea which prompted the management the Company to develop the composition seal bearings with added space for the lubricant.

"Burr Relief" Solves Line Shaft Troubles

Patent papers recently filed by the Bearings Company of America in clude a device which eliminates trouble encountered in removing ball bearings from power transmission line shafts, according to C. D. Adams, Vice-President and Sales

A Practical Handbook for Engineers and Draftsmen

Contains complete engineering data on all sizes and types of ball bearings, including the new composition seal bearings, new transmission bearings, etc. Lies flat on drafting board or desk. Contains no extraneous material. Prepared by engineers for use of engineers. Fill in coupon or write today.

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or write today stating number you want and names to whom you want books sent.

BCA

RADIAL · ANGULAR CONTACT · THRUST

BALL BEARINGS

BEARINGS COMPANY OF AMERICA

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Name .....

Position .....

Company .....

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only factor delaying a well-rounded recovery in the building field.

The Commerce Department's place in the picture has been assigned by Secretary Hopkins to Richard V. Gilbert, former public finance expert of Harvard University; Robert L. Davison, former head of Housing Research Division of J. B. Pierce Foundation; James Hughes, former assistant to the president of the Standard Gas Equipment Co., of Baltimore; Robinson Newcomb, Commerce Department official; and Undersecretary of Commerce Edward J. Noble. All except Mr. Noble are recent appointees to Mr. Hopkin's crew of trouble-shooters commonly identified as "spark-plug" boys and comprise three of the six members of the Department's new division of industrial economics.

Latest word from the division is that further details will not be developed until a six-man committee of men in private business is appointed to advise the group. The members are understood, however, to be attempting to find some method for modifying building code requirements and suggesting materials and construction methods which promise to give the prospective purchaser the most for his money. The Bureau of Standards, which for the past two years has been conducting a series of tests on a variety of building materials and construction methods, is expected to play a prominent part in the work.

Encourage Private Business

Intended to supplement public enterprises financed by the USHA, the plan is to encourage private business and capital to go ahead and develop their own projects, assured that the Government's interest in the matter will go no further than merely to advise, to design homes and apartments for rent to persons in the lower income brackets, and to outline a program for reducing building costs by utilizing scientifically selected materials fabricated to provide adequate strength and efficiency.

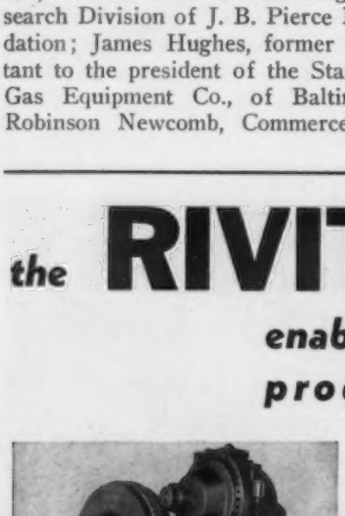
The whole idea is suspiciously similar to one advanced about a year ago by Prentiss L. Coonley, assistant to W. Averill Harriman, chairman of the Commerce Department's Business Advisory Council. At that time, Mr. Coonley made overtures to representatives of the building supply industry, Government officials and private housing authorities, outlining a scheme for applying mass production methods in the low-cost housing field by attracting the cooperation of private enterprise and getting away from government subsidy as embodied in the USHA program. The idea, which never went beyond the embryonic state, apparently has been dusted off by Secretary Hopkins, who wants his morgue-like department to take on the appearance of a beehive of activity in the interest of business.

$17 Monthly for $2000 Home

Home builders, under the new plan adopted by the FHA as a result of changes in the law approved by the last session of Congress, may now make down payments as low as 5 per cent and pay the balance off in 15 years. Excluding taxes and fire insurance monthly payments on a $2000 home, for example, would be $17. The relaxed rules are expected to primarily benefit home owners in smaller cities and towns located where land values are relatively low. At least 5000 existing banks and lending agencies are qualified under the FHA insurance rules to make loans under the new

the RIVITOR

enables you to offer a better product at a lower price



The Rivitor is shown here setting two solid rivets at a time to attach cushion springs to driven clutch plate assemblies. The plates are automatically indexed.

This Rivitor sets two rivets at the same time to attach handle brackets to paint pails.

to effect a stronger riveted joint at rates up to 3200 rivets an hour and at a saving by using the less expensive solid rivets.

You'll do your riveting smoothly, you'll do it automatically and with precision. The setting action is actually one of "coining". The motion proceeds from a fast approach to the riveting position to a slower setting action—giving the metal time to flow.

The Rivitor ably handles many jobs in many industries. Submit samples of your riveting jobs. We should like to show you the type of solid rivet joints that can be effected automatically. We should like you to realize the savings that you are always looking for so that you can offer a *better product for less.*

Send samples to THE TOMKINS-JOHNSON CO.,
628 N. Mechanic St., Jackson, Michigan or get in touch with our representative in your territory:

Boston — General Mach. Corp. . . . Buffalo — R. C. Neal Co., Inc. . . . Chicago — H. F. Wolnick Mach. Co. . . . Cleveland — S. G. Morris . . . Denver — Edward C. Swan . . . Detroit — Haberkorn & Wood . . . Grand Rapids — Joseph Monahan . . . Hartford — George M. Pearse, Jr. . . . Indianapolis — Henry G. Hoss . . . Milwaukee — J. M. Grimstad . . . Newark — George M. Pearse . . . Philadelphia — W. A. Rankin (Drexel Hill) . . . Pittsburgh — J. A. Bouslough . . . Rochester — R. C. Neal Co., Inc. . . . San Francisco — R. W. Conroy . . . Syracuse — R. C. Neal Co., Inc. . . . Canada — Geo. T. White Co. (Walkerville, Ont.) . . . Europe — Gaston E. Marbaix, Ltd., London.

rules and will be required to pay an insurance premium of one-half per cent per annum of the original face value of the loan, to offset in part possible losses. As of July 31, FHA records show the agency had insured more than 2,500,000 loans amounting to $2,625,000,000.

Of all the Administration's multifarious efforts in the housing field, none is of more doubtful value than the three low-cost housing projects built by the RRA in Greenbelt, Md., Cincinnati and Milwaukee, at a total cost of $34,500,000. Although sponsors hoped the experiments would encourage similar projects to be built by private capital, the high construction costs, location, design and the slim possibility of ever paying off the debt, has prompted private enterprise to proceed cautiously.

Steel Farm Buildings Purchased

The Farm Security Administration, formerly the RRA, has $38,000,000 to loan to farm tenants for the construction of homes and farm buildings and in this connection has purchased more than a dozen farm units, consisting of all-steel prefabricated houses, barns, sheds and outhouses, from the Tennessee Coal, Iron & Railroad Co., Birmingham. The steel buildings are being tested through actual use along with frame and other types of units suitable for farm tenants' use but officials have declined to indicate the results of the tests. They point out, however, that the average construction costs in the South of the steel farm units amount to $1800 as compared with $1300 for wood frame units.

The USHA, which has completed five low-cost housing projects in four cities, was turned down last session on its request for increasing its loan authorizations from $800,000,000 to $1,600,000,000 so that its program could be extended to rural areas. Many Congressional members charged that the agency had been running in circles, that the "high rents" to be charged would prevent the poorest from enjoying subsidized housing, and that private interests could do a better job at lower cost to the taxpayers.

7 Companies Get Steel Corn Bin Orders

WASHINGTON — The Department of Agriculture last Wednesday announced awards of 6435 additional steel corn bins, distributed among seven companies as follows: Columbian Steel Tank Co., Kansas City, 2500; Martin Steel Products Co., Mansfield, Ohio, 1415; Perfection Steel Body Co., Galion, Ohio, 1000; A. N. Eaton Metal Products Co. Omaha, Neb., 510; Stefco Steel Co., Michigan City, Ind., 500; Beatrice Steel Tank Co., Beatrice, Neb., 300; and the James Mfg. Co., Fort Atkinson, Wis., 210.

These lettings bring a total of 32,255 steel bins awarded under the department's ever-normal granary program. It is not known whether any more steel bins will be purchased. Complaint of lumber interests that wood bins were left out of the picture caused the department to prepare specifications for 7000 bins of this type on which bids have been asked. Awards for the latter may wind up the bin purchase program. On the other hand additional bids of both types may be purchased. The war situation may make it necessary to purchase more than was originally contemplated.

DODGE TIMKEN BEARINGS

Save Power

...AND REDUCE MAINTENANCE ON HIGH SPEED FAN DRIVES

IN a large sulphuric acid plant . . . Dodge-Timken Pillow Blocks on fans handling sulphur dioxide gas have been operating at 750 R.P.M. under high temperatures over four years for periods of ten months on 24 hour service without shutdowns . . . Dodge offers a complete line of rolling bearings for every industrial service as a part of its complete line of power transmission machinery. Specify Dodge . . it means high quality backed by specialized engineering.

Pointing FOR Profit

THE Right Drive FOR EVERY JOB

DODGE MANUFACTURING CORP.
MISHAWAKA, INDIANA, U. S. A.

Think of

DODGE
MISHAWAKA

. . . when planning a new plant . . . when adding a new department . . . when installing new machinery . . . when modernizing old equipment . . . when designing new products.

. . . PERSONALS . . .

AVERY C. ADAMS, since Dec. 1, 1938, vice-president and assistant general manager of sales for Inland Steel Co., Chicago, has been elected vice-president in charge of sales, a member of the executive committee and board of directors of the United States Steel Corp. of Delaware, effective Oct. 1. He succeeds C. V. MCKAIG, who becomes assistant to president, with duties as may be assigned. Mr. McKaig continues as a member of the executive committee and board of directors.

Mr. Adams has spent his entire business career in the steel industry, having had several years of experience with the Trumbull Steel Co., Warren, Ohio, specializing in metallurgy before entering sales work. In May, 1928, he left Trumbull to become manager of tin plate sales, Republic Steel Corp. The same year he joined General Fireproofing Co. as vice-president in charge of sales, which position he held until June, 1936, when he went with the Carnegie-Illinois Steel Corp. to become manager of sales, sheet division.

AVERY C. ADAMS

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H. W. CHRISTENSEN has been appointed purchasing agent of Columbia Steel Co., San Francisco, succeeding L. S. JONES, retired.

Born in Brooklyn, Mr. Christensen left college to enter military service, and from 1916 to 1920 served as captain in the field artillery. After his discharge from the Army he entered the employ of Consolidated Steel Corp., Ltd., as purchasing agent. In 1933 he joined the Los Angeles sales office of Columbia Steel Co., as manager of the rolled steel products department. In 1938 he was appointed assistant district manager of sales in charge of service, which position he has held until his present appointment.

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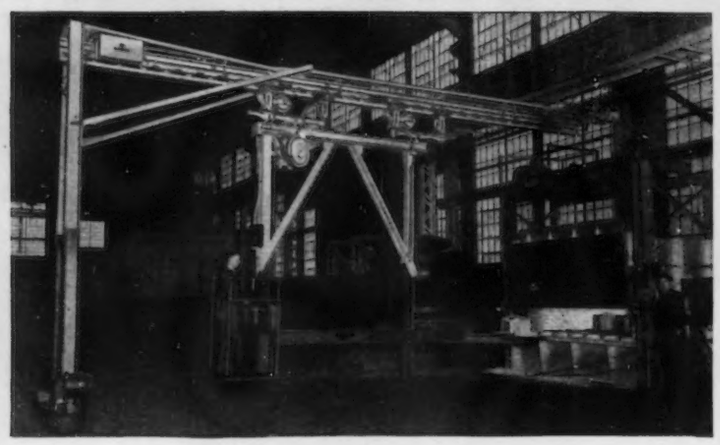
WILSON H. MORIARTY has been promoted from sales engineer to sales manager of the Cleveland works of National Malleable & Steel Castings Co. Mr. Moriarty joined the company in 1919, following graduation from Case School of Applied Science and service in the Army. He was resident

CLEVELAND TRAMRAIL

OVER HEAD HANDLING EQUIPMENT



FURNACE CHARGING GANTRY CRANE

● Forgings and stampings are charged into and removed from the furnace quickly by the fork attached to the carrier of this unusual Cleveland Tramrail single leg gantry crane.

● All operations are easily made through simple controls by the operator who rides on a platform attached to the carrier.

ALSO BUILDERS OF CLEVELAND CRANES ALL WELDED

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DIVISION OF

THE CLEVELAND CRANE & ENGINEERING CO.

1115 Depot St.

WICKLIFFE, OHIO.

Or Consult Your Phone Directory under "Cleveland Tramrail"

C. V. McKAIG

inspector at the East St. Louis plant and later at the Chicago and Cleveland plants, subsequently becoming chief inspector for all plants. He has been in the sales department since 1931.

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J. A. BOUFFARD, manager of pig iron and coke sales of the Hamilton Coke & Iron Co., division of the American Rolling Mill Co., Middletown, Ohio, has resigned to accept a similar position with the Milwaukee Solvay Coke Co., Milwaukee. Mr. Bouffard joined the Hamilton company in 1928, as manager of coke sales and subsequently was promoted to sales of both pig iron and coke. In his new position he will be associated with J. A. B. LOVETT, former head of the Hamilton company and now president of the Milwaukee firm.

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H. H. SIMMONS, advertising manager of the Crane Co., Chicago, has been promoted to manager of advertising and sales promotion, succeeding RUSSELL G. CREVISTON, who has been appointed director of trade relations, a new position. Mr. Simmons had 15 years experience in advertising and merchandising before joining the Crane Co. four years ago. He just completed a term as president of the Engineering Advertisers Association of Chicago and is a director of the National Industrial Advertisers Association.

Mr. Creviston in his new position as director of trade relations will contribute to trade activities in both the industrial, and plumbing and heating fields. He will also develop certain phases of market research. Mr. Creviston was director of advertising and sales promotion for the Crane Co. for the past 10 years.

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CHARLES E. WEBSTER, who has been associated with Canadian activities of the Timken Roller Bearing Co. for 20 years, has been appointed general manager of the Timken Roller Bearing Co., Ltd., Toronto, with office at 55 Charles Street, West.

M. H. MORRIS has been elected president of the Morris Machine Works, Baldwinsville, N. Y. J. L. LONERGAN, who has been identified with the company for the past 37 years, has been elected vice-president and general manager, and A. G. FORSSELL, for the past five years chief engineer and sales manager, has been elected second vice-president.

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G. L. HEHL, formerly plant superintendent at Newark, N. J., for the Sherwin-Williams Co., has been ap-

HOW TO REDUCE YOUR WELDING COSTS
From coast to coast, in plants fabricating welded structures of every description, Murex electrodes are helping to reduce welding costs. The reasons why are many. In one plant high burn-off rate may prove an advantage. In another, rapid deposition, or lack of spatter and smoothness of deposit may do the trick.
There is little question but what, in your plant, too, these Murex features can effect real economies. Why not write today and ask to have a representative demonstrate Murex. No obligation is involved. And, if you have a problem or two concerning welding procedure, his broad experience may prove extremely useful.
1 In marine work, vertical and overhead welding goes easily and quickly with Murex Vertex (reverse polarity) or Genex (straight polarity). Photo courtesy Ira S. Bushey & Sons Co., Inc., Brooklyn, N. Y.
We've a pocket-size pamphlet giving properties of all electrodes in the Murex line. Send for your copy.
2 Only 2700 lbs. of Murex welded this 40,000 lbs. jacketed still. Photo courtesy John Nooter Boiler Works Co., St. Louis, Mo.
3 High speed deposition saves time and money on the Lorain 79 Shovel. Photo courtesy The Thew Shovel Company, Lorain, Ohio.
5 Economy of welding machinery such as this sluice gate hoist is increased by time-saving Murex Electrodes. Photo courtesy Lakeside Bridge & Steel Co., Milwaukee, Wis.
4 Free-flowing Murex downhand electrodes speeded welding on this 96,200 lb. pot chuck, 33 ft. 7 in. in diameter, believed to be world's largest. Photo courtesy Lukenweld, Inc., Coatesville, Pa.
MUREX
HEAVY COATED
ELECTRODES
METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
Albany • Chicago • Pittsburgh
So. San Francisco • Toronto

pointed Eastern manager of industrial sales. H. S. SHERMAN, formerly of the company's Cleveland technical service staff, heads up similar work in the North Central and South Central districts, and LYMAN WEBER, formerly of the Chicago factory, has been appointed to a similar post in Western, Southwestern and Mississippi Valley districts.

CARL STURMER, for the past 13 years identified with the Chicago plant of the company successively as superintendent of the lacquer plant, and production superintendent of lacquer, paint and varnish, has been appointed general superintendent of the company's Newark plant, succeeding Mr. Hehl.

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L. HANSEN, consulting electrical engineer, Harnischfeger Corp., Milwaukee, opened the fall lecture course of the American Welding Society in Peoria, Ill., Sept. 6, with a talk on the "Outline of Welding Processes."

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H. R. LASCH, manager, Machine Tools (Pty.) Ltd., P.O. Box 5458, 206 Commissioner Street, Johannesburg, Union of South Africa, is now in this country making agency arrangements and buying machinery.

G. G. HEIN, president, Hein-Werner Motor Parts Co., Waukesha, Wis., was recently the recipient of a gold watch from 210 employees of his company commemorating 10 years of business for the firm. The presentation was made by Harry Jankowski, one of the oldest employees in the plant.

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STEPHEN W. TERRY, for the past 23 years associated with the LaSalle Steel Co., has been appointed general manager of sales of Monarch Steel Co.,

S. W. TERRY

Indianapolis. He was at one time Wisconsin representative for the LaSalle company, later superintendent of production, and since 1929, Indiana representative.

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JOHN S. BARTEK, formerly chief engineer of the Modern Tool Works, Rochester, N. Y., has returned to the engineering staff of the Pioneering Engineering & Mfg. Co., Detroit.

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W. ROY MOORE, since December, 1938, director of sales of the Peck, Stow & Wilcox Co., Southington, Conn., has been added to the sales force in the New England territory, with headquarters at 31 Hillside Avenue, Plantsville, Conn., of Clemson Brothers, Inc., Middletown, N. Y.

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RAY P. TARBELL has joined Una Welding, Inc., Cleveland, as sales engineer, specializing in automatic welding applications. He formerly was

McKAY TUBE MILLS
(ACETYLENE WELD)

McKay Tube Mills—built in a complete size range—all possess certain characteristic design features which have proven of definite value under actual production conditions. We list a few of the outstanding features:

SINGLE UNIT CONSTRUCTION: Forming Units—Welder—Flash Trimmer—Sizing and Straightening Units and Cutoff are mounted on a one piece welded bed plate, heavily reinforced—with the accurate alignment shoulders required—permanently machined onto the top surface. This makes the machine an entirely self-contained unit, with none of the field alignment problems which occur where separate units are used.

FLOOR SPACE REQUIREMENTS: Single unit construction cuts floor space requirements in half. Machine illustrated will make up to ⅝" tube—space required 15'0" by 4'0". A machine to make up to 1½" tube requires only 21'0" by 5'8".

McKAY FORMING ROLL DESIGN: Maintains accurate seam alignment, necessary for good seam weld. It also produces a smooth tube, with size maintained closer than commercial tolerance requirements.

CENTRALIZED CONTROLS: Heat, speed and pressure controls placed for maximum convenience of operator.

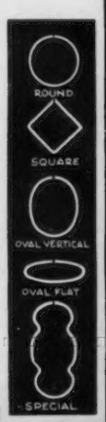
QUICK CHANGE-OVER: Actual production conditions prove that a complete change-over from one size tube to another can be made in less than three hours by regular operator and helper. This is because McKay construction includes enough auxiliary equipment so that units may be interchanged without disturbing vital settings.

McKAY "McKROMETER" ROLL PRESSURE ADJUSTMENT: (Covered by U. S. Patent 2,122,615). Allows actual recording of correct pressure settings at each pass for each diameter and gauge tube.

HIGH SPEED WELDING: Latest type high speed welding head—and pressure roll equipment developed in collaboration with Linde Air Products Company, gives highest speeds consistent with quality of product and economical welding method.

CUT-OFF: High speed rotary head or rotary saw available, to suit requirements.

The above represents only a few of the advantages of McKay equipment. Call on us for complete information, samples and demonstration.



THE McKAY MACHINE CO.
Engineers and Manufacturers of
SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

McKAY McKROMETER ADJUSTMENT

WILLIAM A. ROSS (above), newly elected president of Columbia Steel Co., and A. N. Diehl (below), retiring president. Announcement of the changes appeared in these columns last week.

connected in similar capacities with the Lincoln Electric Co. and the Babcock & Wilcox Co.

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HAROLD G. JONES, who has been in the manufacturers' agency business in Pittsburgh since 1926, has been appointed agent in western Pennsylvania, West Virginia and eastern Ohio for the Thomas Laughlin Co., Portland, Me.

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PEDRO C. MORALES, former general superintendent of machinery and motive power of the National Railways of Mexico, has been appointed representative in Mexico for the Iron & Steel Products, Inc., Chicago.

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The T. B. Wood's Sons Co., Chambersburg, Pa., has appointed M. L. Erlenmeyer of Elmira, N. Y., distributer for its complete line of power transmission machinery at Elmira. The T. B. Wood company has also appointed the Boyer-Campbell Co., Detroit, as distributer for Detroit and vicinity for the sale of Wood's V-groove sheaves and has appointed Berger Brothers Electric Motors, Inc., of Rochester, N. Y., as distributer for the complete line of groove sheaves and V belts.

45,000 See U. S. Steel Exhibit at Fair in Day

A RECORD breaking crowd of more than 45,000 persons visited the United States Steel Corp. subsidiaries exhibit building at the World's Fair on Aug. 27. An average of 3763 an hour or approximately 63 persons every minute passed through the building. This attendance far surpassed the previous high of July 3 when the corporation played host to 31,971.

A manufacturer who brings the vigor of mountain air to town via air conditioning asked Parish to produce a pressed steel casing for his air conditioning unit. The result is shown here—a splendid Parish execution in cold rolled steel .0375" thick.

A clean-cut stamping like this—whether light gauge or heavy—gives greater sales appeal to any product. Parish has the equipment, laboratory, personnel and skill to do this for you economically. May we help improve *your* product?

PARISH PRESSED STEEL CO., Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St., San Francisco, Cal.

SPECIALISTS IN STAMPINGS OF DISTINCTION

Cold-forged
FOR STRENGTH...
UNIFORMITY...
FINISH

Produced by an improved process, developed through years of experience in the manufacture of precision screw products, Parker-Kalon Wing Nuts, Cap Nuts, Thumb Screws and Socket Screws have the quality that wins unqualified approval of engineers and production men. Write for free samples . . . compare . . . see for yourself. Stocked by reliable industrial distributors near you.
PARKER-KALON CORP.
200 Varick St., New York, N. Y.

PARKER-KALON
Cold-forged
SOCKET SCREWS
WING NUTS · CAP NUTS
THUMB SCREWS
SOLD THROUGH REPUTABLE DISTRIBUTORS

Machine Tool Handbook Issued By New Departure

NEW DEPARTURE, Division of General Motors Corp., Bristol, Conn., is ready to distribute a new machine tool handbook, a 200-page book containing descriptions, dimensions, capacity ratings and mounting data for 20 types of New Departure ball bearings used in machine tools, including seven types designed especially for precision machines; also includes bearing tolerances and mounting fits, data for bearing selection and application, and a complete section devoted to typical installations of ball bearings in machine tools.

A limited edition has been printed, but regularly employed engineers and designers of machine tools may obtain a copy of this book by requesting it on their letterhead from New Departure.

Applications For $1,748,977 NPA Projects Returned

WASHINGTON — Because of lack of funds the Federal Works Administration has returned applications for 5043 projects involving grants of $766,803,691 and loans of $242,445,063. The total cost of the returned projects was estimated at $1,748,832,977. Administrator John M. Carmody said that a large number of these projects, of which 3017 had been examined and a large percentage approved, possibly could be privately financed.

Porcelain Enamel Institute Forum Oct. 18

CHICAGO—The fourth annual forum of the Porcelain Enamel Institute will be held Oct. 18 to 20 at Ohio State University, Columbus, Ohio. Among features of the meeting will be symposiums on fine ground enamel, and dry process enameling problems. Other topics to be discussed include "Sunflowers and Powder Blisters," "Fineness of Enamels," "Cast Iron for Enameling Purposes," "Use of Softened Water in Cleaning and Pickle Room Practice," "Drawing Compounds," and "Health Hazards and Their Control in Pickling Operations."

"What the Jobbing Shop Must Do to Handle Architectural Work," "The Architect Looks at Porcelain Enamel," "Development of Specifications That Will Meet Building Code Requirements," "Some Observations on a Settling Test for Determining the Fineness of Porcelain Enamel," "Effect of Variations of Enameling Between Draws," "Control of Enamel Application," "Use of Fuel Oil in the Enameling Field," "Ball Milling Practice," "Ball Mill Wet Grinding," "Proposed Tentative Standard Test for Impact Resistance," "Welding for Enamel Parts," "Inspection, Checking and Field Problems of Porcelain Enameled Products," and "Forum Plans for 1940."

Heavy-Duty Boring Lathes for Export

(CONCLUDED FROM PAGE 60)

not available for test purposes, all tests were made on forged pieces of S.A.E. 1040 steel, 36 in. in diameter and 30 ft. long. The tests were planned primarily to absorb power and prove the strength and design of the machines rather than to demonstrate the sustained operating capacities of the lathes. The first test was to bore a 16-in. hole in a solid forging, using a V-shaped bit such as shown in Fig. 5. With the workpiece revolving at 10 r.p.m. and the bit feed set at 0.3 in. per min. or 0.03 in. feed per revolution, 6.03 cu. in. of metal was removed per revolution, the cutting speed being 41.9 ft. per min. This test required 68 hp. from the main drive motor and 1.78 hp. from the feed motor.

In the second test the 16-in. hole was opened to 21½ in., using the boring head shown at the left in Fig. 5. Speed was reduced to 6 r.p.m., feed per min. was 0.4 in., or 0.0667 in. per revolution. This gave a cutting speed of 33.77 ft. per min. and removed 10.8 cu. in. of metal per revolution; 85 hp. was required from the main drive motor and 2.78 hp. from the boring bar feed motor.

The final test involved enlarging the bore from 21½ in. to 27⅛ in. In this, the piece was rotated at 7.5 r.p.m. and the feed was set at 0.25 in. per min. or 0.0334 in. per revolution; 7.18 cu. in. of metal was removed per revolution of the test piece, the surface cutting speed being 53.3 ft. per min. This required 96.4 hp. from the main drive motor and 1.3 hp. from the boring bar feed motor.

Regular tool steel bits were used in all the tests, being reconditioned before starting each test. However, even under the heavy punishment to which the tools were subjected, they did not show evidence of abuse at the end of any test. No tool life tests were conducted.

. . . PIPE LINES . . .

United Natural Gas Co., Oil City, Pa., plans extensions in 8-in. welded steel pipe line from La Mont, Elk County, Pa., to Westmore, McKean County, about six miles, for natural gas transmission. Work will be carried out by company forces.

Benedum-Trees Oil Co., Benedum-Trees Building, Pittsburgh, plans 6, 8 and 10-in. steel pipe lines in oil field district near Marshburg, McKean County, Pa., in conjunction with drilling of several new wells in that area, including connecting pipe lines with new steel tank storage units, to be constructed, and present crude oil pipe line system.

Champlin Refining Co., Enid, Okla., plans 6-in. welded steel pipe line from Superior, Neb., to Sioux City, Iowa, about 280 miles, for gasoline transmission. Line will connect with present system at first noted place, from which pipe line from Enid, close to 240 miles, is now operated. New bulk storage and distributing terminal will be located at Sioux City. Booster pumping stations will be installed along route.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 20 for welded steel pipe; also for galvanized welded steel pipe (Schedule 3583).

General Gas Pipe Line Corp., Circle Tower Building, Indianapolis, has begun hearings before Federal Power Commission, Washington, for permission to build new 20-in. welded steel pipe line from gas field in Hart County, Ky., to point in Hamilton County, Ind., about 180 miles, for natural gas transmission, connecting with present pipe line system at latter point; also for permission to build about 40 miles of 3, 4, 6 and 8-in. steel pipe lines for gathering system in gas field district noted. Commission has granted authority to Kentucky Natural Gas Corp. to intervene in proceedings on plea that it is serving territory that General Gas Company proposes to include. It has denied, however, intervening petitions of several bituminous coal organizations and group of 15 railroads, on basis that none of these produce, transmit or distribute natural gas in area stated.

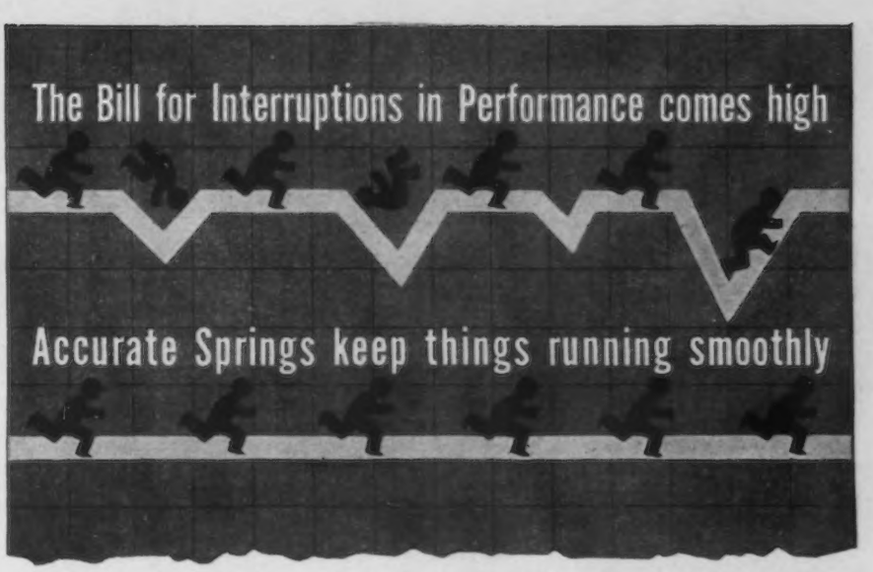
St. Elmo, Ill., has awarded contract to Gorman & Gorman, Pampa, Tex., for steel pipe line system for natural gas distribution, including main welded steel pipe line from source of supply in Avena Township to municipality, with control station and other operating facilities.

Bureau of Reclamation, Phoenix, Ariz., asks bids until Sept. 22 for 175,000 lb. of steel tunnel-liner plates, including steel lagging, in connection with hydroelectric power plant and appurtenant works at Parker Dam development, California-Arizona, about 15 miles from Earp, Cal.

Southern California Water Co., 1206 Maple Avenue, Los Angeles, has authorized 12 and 14-in. welded steel pipe, 3/16-in. thick, for new main water line from reservoir at Circle Drive and Westminster Road, Huntington Beach, Cal., to Twenty-third and Palm Streets, about 4500 ft.

Sahara Oil Co., Pecos, Tex., will take bids at once for new 3-in. pressure pipe line from oil field area in Ward County, Tex., to connection with present main pipe line system, about 50 miles, for crude oil transmission, route to be along Pecos River. It is proposed to use heavy cast iron screw joint pipe.

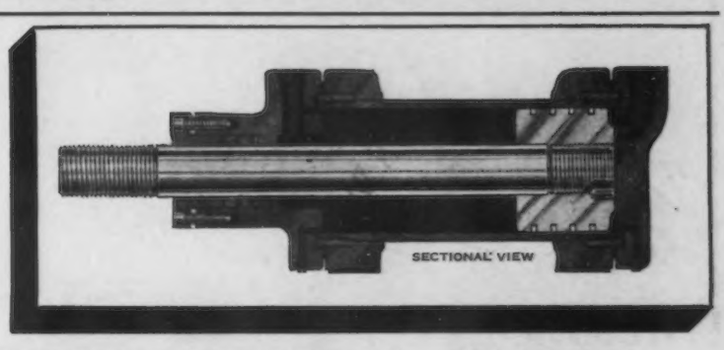
Bureau of Reclamation, Denver, reports Laclede Steel Co., St. Louis, low bidder on 750,000 ft. of 1-in. black steel pipe (Invitation A-38446-B). Bureau of Reclamation, Denver, asks bids Sept. 15 for 140,000 ft. of 1-in. outside diameter pipe bends and couplings for Marshall Ford Dam, Tex. (Invitation A-46782-A).



B-G-R SPRINGS
SMALL STAMPINGS
WIRE FORMS

An ability to solve knotty spring difficulties ... to get customers out of holes ... has gained B-G-R the confidence of many spring users. B-G-R helps you to design the *right* spring ... and the combined resources of two complete plants see to it that *your* schedules are maintained.

BARNES-GIBSON-RAYMOND
DETROIT PLANT — DETROIT, MICHIGAN ← TWO PLANTS → ANN ARBOR, MICHIGAN — COOK PLANT



PRACTICAL HYDRAULIC CYLINDER ADVANTAGES . . . Hannifin high pressure hydraulic cylinders are stronger, simpler, easier to use. Their exclusive design assures high efficiency operation and extra ruggedness to withstand severe service. Check these features: *No tie rods.* End caps are removable without collapse of other parts. *Universal caps.* Can be positioned with inlet port at top, bottom, or either side. Can be moved without disturbing mounting. *Air Vent plugs.* Each cap has air vents on three sides. *Leakproof.* Special mirror finish honing produces a cylinder bore straight, round, perfectly smooth. No leakage and minimum fluid slip.

Write for new Bulletin 35-A with complete specifications.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue, Chicago, Illinois
Engineers • Designers • Manufacturers
Pneumatic and Hydraulic Production Tool Equipment

HANNIFIN *hydraulic* **CYLINDERS**

Steel Orders Pile Up But Kulas Warns, "Everybody Loses in War"

CLEVELAND—"The supreme lesson taught by the last World War was the fact that all parties concerned were losers," said E. J. Kulas, president, Otis Steel Co., in a message to employees this week as the steel industry experienced one of its biggest buying waves in years.

"In addition to an appalling loss of life on both sides there was enormous economic loss for all countries as well," he said. "The world-wide business depression which followed the war is one from which we have not yet fully emerged here in our own country.

"The idea that business makes money out of war is a fallacy. Any profits made on war orders are a drop in the bucket compared to the losses which business suffers on the day of reckoning which inevitably follows.

"This is just as true of the steel industry as it is of any other industry. Steel depends for its progress, its payrolls and its profits upon the peacetime prosperity of the country. The major business of steel always has been that of supplying a basic material for the machines and devices that do the work of the world.

"The present European picture is an international catastrophe. Even though the conflict should be brief, it has already involved a tremendous economic waste through the diverting of millions of men from useful, everyday occupations into military activities, for which the whole world, including the United States, will have to pay.

"Sherman was right!"

Government Steel Order

WASHINGTON—Apparently reflecting intensified industrial preparedness, Government contracts for iron and steel, machinery and non-ferrous metals shot sharply upward, as reported by the Labor Department's Public Contracts Division for the week ended Sept. 2. Awards for iron and steel were $1,087,964; machinery, $1,409,961 and non-ferrous metals, $311,488. Details follow:

Iron and Steel Products

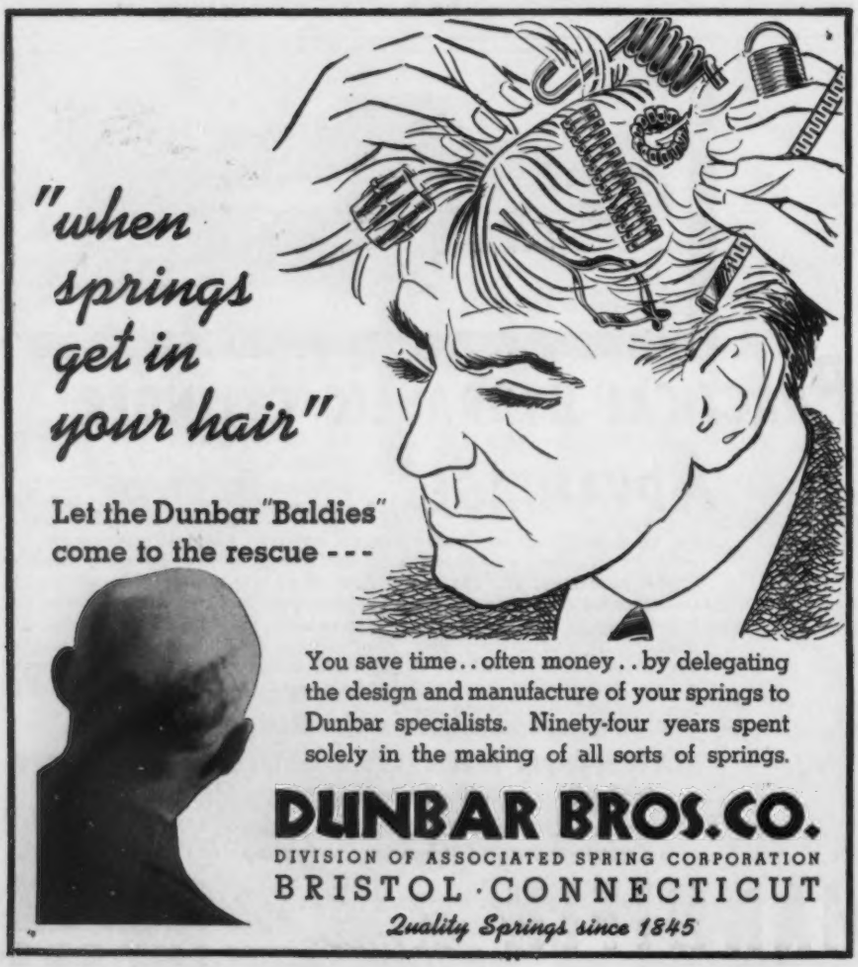
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., Navy S & A, bolts and nuts, brass and steel	$21,649.65
The Midvale Co., Washington, Navy S & A, steel forgings	26,100.00
Bethlehem Steel Co., Bethlehem, Pa., Navy S & A, steel forgings	609,000.00
Crucible Steel Co. of America, New York City, Navy S & A, steel forgings	67,550.00
The Steel Improvement & Forge Co., Cleveland, Navy S & A, steel forgings	51,175.00
Crucible Steel Co. of America, New York, War Ordnance, liner forgings	47,125.00
John W. Beam, Denver, Interior, outlet pipes	14,450.00
General Electric Supply Corp., New York, WPA, rigid conduit	31,108.52
Capitol Steel Co. of New York, New York, WPA, reinforcing bars	17,224.60
Hall-Hodges Co., Inc., Norfolk, Va., Norfolk Navy Yard, reinforcement bars	22,752.10
Treadwell Construction Co., Midland, Pa., TVA, radial gates	38,661.00
Mitchell Metal Products, Inc., Cleveland, Navy S & A, practice bombs	87,325.00
Locke Insulator Corp., Pittsburgh, Interior, bolts, plates, screws, fittings, nuts	19,031.32
Lundquist Tool & Mfg. Co., Worcester, Mass., War Signal Corps, reel	34,812.00

Non-Ferrous Metals and Alloys

Bridgeport Brass Co., Bridgeport, Conn., War Ordnance, cartridge brass discs	$126,640.00
Chase Brass & Copper Co., Inc., Waterbury, Conn., Navy S & A, brass	Indefinite
Revere Copper and Brass, Inc., Baltimore Division, Baltimore, Navy S & A, brass	21,867.46
The American Brass Co., Waterbury, Conn., War Ordnance, cartridge brass cups	40,740.00
Revere Copper & Brass, Inc., Baltimore division, Baltimore, Panama Canal, brass pipe	31,327.77
Chase Brass & Copper Co., Inc., Waterbury, Conn., Panama Canal, brass pipe	15,538.70
Pressed Steel Tank Co., West Allis, Wis., Newport Torpedo Station, bronze shells	22,041.60
Federated Metals Division American Smelting & Refining Co., San Francisco, Navy S & A, bronze, manganese	23,250.00
Bridgeport Brass Co., Bridgeport, Conn., War Ordnance, gilding metal	30,082.50

Machinery

Baldwin-Southwark Corp., Philadelphia, TVA, turbines and governors	$784,992.00
Rockford Machine Tool Co., Rockford, Ill., Navy S & A, machine, slotter	15,925.00
Henry Prentiss & Co., Inc., New York, Navy S & A, turret lathes	30,563.00
Wm. Sellers & Co., Inc., Philadelphia, Norfolk Navy Yard, planer parts	10,600.00
Brown & Sharpe Mfg. Co., Providence, R. I., War Ordnance, milling machines	52,722.00
Ex-Cell-O Corp., Detroit, War Ordnance, shell turning machines	35,809.40
Universal Stamping Machine Co., Stamford, Conn., Post Office, cancelling machines	26,700.00
M. T. Davidson Co., Brooklyn, Navy S & A, pumps	11,334.00
Baldwin-Southwark Corp., Eddystone, Pa., Navy S & A, hydraulic equipment	47,607.00
Kelly Vail Tractor Co., Inc., Jackson, Miss., War Engineer, tractors with bulldozers and hoists	18,109.30
Bedford Foundry & Machine Co., Bedford, Ind., Interior, traveling crane	12,700.00
Ingersoll-Rand Co., Cincinnati, War Air Corps, exhausters, blowers	222,300.00
Allis-Chalmers Mfg. Co., Milwaukee, War Air Corps, exhausters, blowers	140,300.00


"when springs get in your hair"
Let the Dunbar "Baldies" come to the rescue ---
You save time.. often money.. by delegating the design and manufacture of your springs to Dunbar specialists. Ninety-four years spent solely in the making of all sorts of springs.
DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL · CONNECTICUT
Quality Springs since 1845

August Steel Output 3,763,718 Tons

Highest Since September, 1937

PRODUCTION of open hearth and bessemer steel ingots in this country during August was 3,763,718 gross tons, the highest monthly total since September, 1937, according to the American Iron and Steel Institute.

The August tonnage was 19 per cent above the revised figure for July of 3,162,534 gross tons, and was nearly half again as large as the total of 2,537,102 gross tons produced in August a year ago.

Production in the steel industry during the month was equivalent to 62.22 per cent of capacity, which compares with the revised figure of 52.40 per cent for July and with 42.68 per cent in August, 1938.

An average of 849,598 gross tons of ingots was produced weekly during August, as against the revised weekly output of 715,505 gross tons in July and 572,709 gross tons per week in August of last year.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
1938	Open-Hearth	Bessemer	Monthly	Weekly		
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.29
August	2,309,207	196,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.30
1st Quarter	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter	8,345,943	563,405	9,022,409	693,498	13.01	50.79
1st 6 months	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	2,893,916	229,380	3,162,534	715,505	4.42	52.40
August	3,469,453	247,252	3,763,718	849,958	4.43	62.22

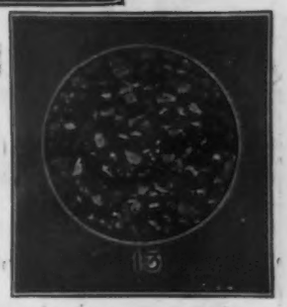
Figures for July, 1939, have been revised.

Morituros Vos Salutamus

WITHOUT professing an expert knowledge of Latin, we put into reverse the well-known expression "Morituri, salutamus"—"We who are about to die salute you." In this case, we salute those who are about to die—politically, namely, the brain trust.

Goodbye Corcoran and Cohen and the rest of the "hot dog" boys who have been allowed to play bingo with American futures. When the pinch comes and America feels the need of strengthening its teams for the World's series, out the window go the sandlot boys and in come the professionals.

When America is faced with responsibilities such as at present, there is no longer any opening for pretty theories. Nor positions for pretty theorists. Morituros Vos Salutamus.



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Springs usually have highly important functions to perform. It is therefore to the best interest of the manufacturer to secure the best possible spring; so that the performance of his own product may not suffer.
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AND MANUFACTURING CORPORATION
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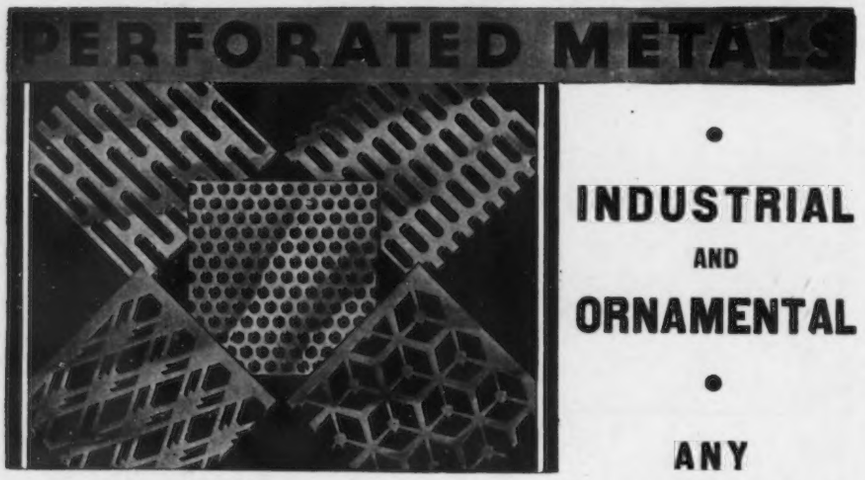

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. . . OBITUARY . . .

RICHARD B. WOODWARD, general shop and field representative of the William B. Pollock Co., Youngstown, died Aug. 30 following an automobile accident.

MR. WOODWARD helped build 55 blast furnaces. For 35 years he was employed by the Pollock company. He was born in Mt. Nebo, near Lowellville, Ohio, Oct. 14, 1869.

❖ ❖ ❖

DRESSER T. BATES, one of the organizers of the Athol Machine Co., Athol, Mass., which was sold to the late L. S. Starrett, and serving as superintendent of the plant until his retirement 15 years ago, died at his home at Orange, Mass., Monday, Aug. 28. He was born in Webster, Mass., Nov. 20, 1844.

❖ ❖ ❖

HASKIN WILLIAMS of the Birmingham Rail & Locomotive Co., Birmingham, died Aug. 28 after a short illness. MR. WILLIAMS went to Birmingham in 1896 and established the Birmingham Rail & Locomotive Co., which he and his brother, R. J. Williams, have operated since.

CAST IRON PIPE

Wilmington, N. C., plans pipe line extensions in water system and other waterworks installation. Bond issue of about $1[illegible]4,000 is being arranged for this and sewerage system, etc.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Wilhelm F. Knauer, director, closes bids on Sept. 21 for cast iron pipe and elbows (Class 361).

Water Department, Wichita, Kan., will take bids soon for 48-in. main pipe line from wells now being drilled for new water supply source to connection with city system, about 25 miles, with alternate bids on cast iron, steel and steel-lined concrete pipe. Cost about $1,000,000. This is part of water system expansion and improvements estimated to cost $2,485,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Blaine, Wash., plans about 7215 ft., 4 to 12-in. pipe, for main water lines and approximately 3400 ft. of smaller size for distribution lines. Financing is being arranged in part through Federal aid.

Hawthorne, Cal., plans about 3700 ft. of 14-in. pipe for main water line. Special election has been called on Sept. 18 to vote bonds for $43,000 for this and other municipal improvements.

Waxhaw, N. C., plans pipe lines for water system and other waterworks installation. Fund of about $75,000 is being arranged for this and sewerage system, of which $42,000 will represent a bond issue. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Water Department, Dallas, Tex., James Aston, city manager, plans about 43,520 ft. of 12-in., 16,250 ft. of 8-in., and 26,450 ft. of 6-in. pipe for extensions in water system. Fund of about $285,000 is being arranged for this and other waterworks installation, of which about $118,000 will represent Federal aid.

Shelby, N. C., closes bids Sept. 19 for 2780 ft. of 12-in., and 1400 ft. of 6-in. pipe for water system; also for gate valves, etc. D. R. S. Frazier, Shelby, is consulting engineer.

The Machine Tool Show in Print

EVEN though the National Machine Tool Builders Association has decided not to hold its show this fall in Cleveland, THE IRON AGE is going forward with its machine tool show issue for Sept. 28. This important issue has long been planned as the climax issue in THE IRON AGE's editorial campaign in behalf of improved machinery and will contain the sixth and final chapter in the series. Also in view of the cancellation of the show, the scope of the issue has been broadened and it will be as complete as it is possible to make it, with photographs and descriptions of the new machines that would have been exhibited for the first time. Thus this issue will be the show in print, and will form a permanent record of the accelerated advances in machine tool design and performance made in anticipation of the show and at a time when industry is willing and ready to take advantage of the latest techniques and equipment.

. . . THE NEWS IN BRIEF . . .

WAR'S EFFECT ON INDUSTRY.—Page 52A.

WAR AND MACHINE TOOLS.—Page 52E.

National Machine Tool Builders Association postpones indefinitely its Machine Tool Show, originally scheduled for Oct. 4-13 at Cleveland.—**Page 52F.**

IF WAR BRINGS PRICE CONTROL TO STEEL.—Page 52H.

Brazil gains in importance as market for electrical equipment made in U. S.—**Page 70.**

Automobile industry increases its purchases of steel, metals and other products as war comes. Assemblies making gradual recovery in volume.—**Page 78.**

Greater facilities for research in aluminum to be available following additions to New Kensington, Pa., laboratories.—**Page 81.**

Soaking pits are improved by Jones & Laughlin Steel Corp.—**Page 81.**

Washington reports a pre-war atmosphere as Administration takes many steps designed to keep government prepared for any developments.—**Page 82.**

ICC suspends reduction in pipe and fittings rates from Memphis to southwestern points.—**Page 84.**

CIO affiliate wins election at Westinghouse plant at Lima, Ohio, by vote of 574 to 510.—**Page 84.**

Steel plants in United Kingdom operate at 95 per cent.—**Page 84.**

New Deal holds to belief that building industry is key to recovery.—**Page 85.**

Forty-five thousand see U. S. Steel Corp. exhibit at World's Fair in single day.—**Page 91.**

Machine tool handbook issued by New Departure Division of General Motors Corp.—**Page 92.**

Porcelain Enamel Institute forum Oct. 18-20 to include symposiums on fine ground enamel and dry process enameling problems.—**Page 92.**

Applications for WPA projects, involving $1,748,832,000, are returned due to lack of funds.—**Page 92.**

London Houses Find It Difficult to Do Business

THE difficulties encountered by business houses in London since the outbreak of war are illustrated by the following cable from the British representative of THE IRON AGE:

"Our office now evacuated to the country, but we are retaining London connection. Business temporarily hampered as London business houses are now widely scattered owing to present very fluid conditions."

SECTIONS INDEX

Personals	88
Obituary	96
Current Metal Working Activity	102
Steel Ingot Production	103
Summary of the Week	104
Comparison of Prices	105
Pittsburgh, Chicago, Cleveland, Philadelphia and New York markets	106
Scrap Market and Prices	110
Finished Iron & Steel	112
Pig Iron & Raw Material Prices	114
Warehouse Prices	115
Fabricated Steel	116
Non-ferrous Market	117
Plant Expansion & Equipment	120
Machine Tool Activity	122

MEETINGS

Sept. 14 to 17—National Association of Foremen, Pittsburgh.

Sept. 20 to 22—National Industrial Advertisers Association, New York.

Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.

Oct. 6 and 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.

Oct. 16—Society of Automotive Engineers, annual dinner, New York.

Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.

Oct. 23 to 27—National Metal Congress, Chicago.

Oct. 24 to 26—Purchasing Agents Association of Baltimore, products exhibit, Baltimore.

Government orders in week ended Sept. 2 total $1,087,964 for iron and steel, $1,409,961 for machinery and $311,488 for nonferrous metals.—**Page 94.**

August steel ingot production of 3,763,718 gross tons is highest since September, 1937.—**Page 95.**

Iron Age issue for Sept. 28 to be "National Machine Tool Show" in print.—**Page 97.**

National Metal Congress Show opening, slated for Oct. 23, at Chicago, remains unchanged despite war outbreak.—**Page 101.**

Labor Board orders DeKalb Iron Workers Association, Auburn, Ind., "disestablished."—**Page 102.**

Business men are aghast at the slaughter in Europe and America must build up its "self-discipline, productivity and good-will," W. Gibson Carey, Jr., says in special message to the U. S. Chamber of Commerce, which he heads.—**Page 102.**

E. T. Weir will address the 17th annual convention of the American Institute of Steel Construction in New York City, Oct. 17-18.—**Page 102.**

Concrete Reinforcing Steel Institute publishes pamphlet on "Rusty Bond Bar Tests and High Yield Point Research."—**Page 102.**

Snow-Cruiser, a tank-trailer-laboratory made of Inland Hi-Steel soon to proceed to South Pole.—**Page 102.**

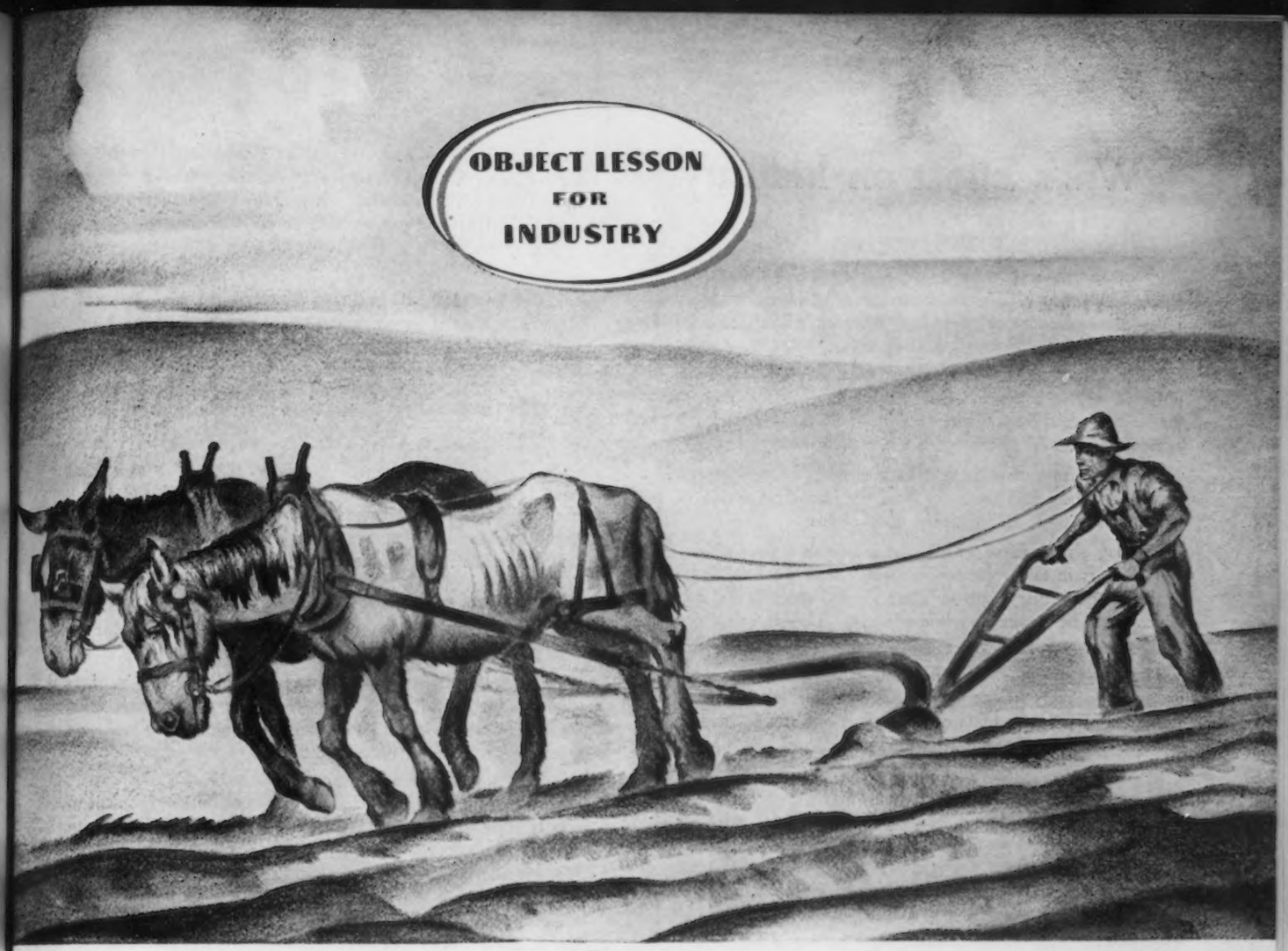
Steel output climbs 12 points to 71 per cent as war-stimulated buying wave of orders reaches mills.—**Page 104.**

Shipments of finished steel by U. S. Steel Corp., subsidiaries rise to 803,822 tons in August, an increase of 127,513 tons over July and a gain of 245,188 tons over August, 1938.—**Page 118.**

Canada experiences buying rush for steel and pig iron.—**Page 122.**

Rail income at 1.66 per cent rate.—**Page 122.**

Steel orders pile up but E. J. Kulas, Otis Steel Co., president, warns industry: "We all lose in war."



A GOOD MAN CAN'T DO MUCH WITH A POOR TEAM

(BASED ON THE ARTICLE, "A MAN AND A TEAM", BY WENDELL E. WHIPP.)

THE farmer—no matter how good he is—knows he can't turn out a full day's work with a broken down team.

A top lathe hand can't do his best work if his machine—the other half of his team—is old or inefficient.

Both know what's wrong with their production. But, the farmer may not be able to buy good horses, or, a tractor—and the lathe hand hasn't the authority to buy a modern machine!

BUT you have . . . you can . . . and you should!

And you would if you realized that it's not the production you're getting that counts . . . but what you're NOT getting that affects your net profits.

If you net an average of 5%—what does it cost you . . . in cold cash . . . when, because of old machine tools, you FORCE your operators to produce 25% to 50% less than they should?

Can you afford to ignore those old machines? May we send one of our PROFIT ENGINEERS over to your office?

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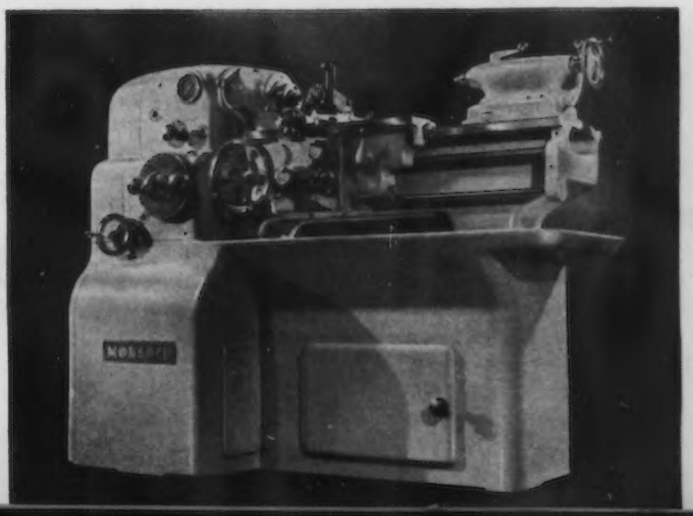

MAKE MORE MONEY
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War's Effect on Industry

(CONTINUED FROM PAGE 52D)

panies whose work involves construction of blast furnaces have received some hints of possible new installations, although the latter are still in the very tentative stage.

Blast furnace rehabilitation must take place immediately, not only because of a general increase in pig iron demand, but, as far as the steel companies are concerned, as a possible hedge against steel scrap prices which are rapidly rising.

The renovation of open-hearths is steadily going forward in a routine manner, and the steel industry finds this phase of the steel making cycle in relatively good shape.

Soaking pit capacity, which was a serious bottleneck in 1936 and 1937, is in fair relationship today with the total ingot capacity of the country, but there are several spots in the industry which must be cleaned up immediately. This is being done as rapidly as possible.

The relationship of blooming mill capacity to steel ingot capacity is probably in the best balance in the industry's history. Some minor adjustments are being made and can be made without serious effect on general production. There are in existence many blooming mills which have not been utilized for some time and which can be placed in shape in a relatively short period to relieve the strain on other equipment.

The above survey covering the primary departments of steel making is exceedingly important because the greatest strain of an extraordinarily large demand will be placed upon the blast furnace, the open-hearth, the soaking pits, and especially the blooming mill. Export orders for the most part will consist of semi-finished billets, blooms, and slabs, and probably large tonnages of bars.

Some Equipment Being Ordered

Possible needs which already are being scrutinized carefully, as far as the finishing departments in the steel industry are concerned, include mostly what is known as auxiliary equipment. Large continuous flat rolled sheet and strip mills are today in an excellent state of efficiency. There are, however, several points in the cycle of production which must be speeded up. Steel industry and steel equipment engineers are studying this situation now and, for the most part, are prepared to take care of this angle in a rapid fashion.

Already steel mill equipment companies have noted a sharp upward turn in inquiries. The equipment now being ordered and on which quotations are being supplied is not of the heavy type but, in the aggregate, looms heavy in dollar volume.

Specifically, such equipment or auxiliaries as reels, coilers, uncoilers, shearing lines, shears, belt wrappers, skin pass mills, electrolytic cleaning lines, etc., all of them intended to speed up the strip mill cycle, are far more active than was the case two weeks ago.

Subsequent heavier steel demand, should it appear to be of the long term type, because of unlooked for European and domestic developments, will find both the steel industry engineers and steel mill equipment makers in excellent shape to furnish decisive action with regard to new bar mills, structural mills, and further strip mill improvements.

No Steel Labor Shortage Seen

Barring actual entrance of the United States into the European war, there is little likelihood of a labor shortage in the steel industry similar to that faced in the early days of the last European war. While the iron and steel industry suffered a loss of labor efficiency from 1914 on, authoritative sources believe that such loss during a war time preparedness period or even an actual war period, will be far less than that sustained in past years.

The United States now has a reservoir of unemployed persons who can be rapidly trained to fill semi-skilled positions and are already capable of being taken on as common labor. Although steel companies throughout the country at the present time are adding to their employment rolls for several weeks at least, this new man power will represent employees who had been furloughed.

If an emergency should arise, whereby a temporary shortage of labor becomes existent, it is entirely possible that a governmental decree might abrogate 40-hour law, but the iron and steel industry with its present man power and what it knows it can obtain on short notice, is fully capable of operating at a sustained high rate of activity without serious trouble. Entrance of the United States into a war, however, would intensify the labor situation and present far more difficult problems. None the less, even this remote possibility can be handled in a far better way than past experience disclosed.

Specifically, no extreme shortage of skilled steel workers is likely in the near future. Because of the 40-hr. week, all steel companies have what is known as a floating turn to replace men whose work time has reached the limit.

There is, however, right now a relatively serious shortage of expert machinists. Increased employment on Government projects tending toward national defense, etc., and a relatively small number of apprentices in the past few years has been responsible for this shortage. Many steel mills are training machinists as quickly as possible. While there is a potential shortage of welders which will increase with further pick up in steel demand, authoritative sources say such crafts can be trained in six months. Such semi-finished skilled labor as chippers and scarfers, while approximating a potential shortage, are already being rapidly trained. Obviously common labor, under present conditions, is abundant.

No Irresponsible Strikes, Says Murray

A question in many steel executives' minds, although not openly voiced as yet, centers around the possibility of labor policies regarding strikes and cessation of work during an emergency period. Contracts between the SWOC and steel companies specifically state there shall be no cessation of work during negotiation of difficulties. Unlike many of its sister unions in the CIO group, the SWOC's history so far is not marked with violation of agreements. That iron clad control over the activity of its membership toward stability of operation and toward a minimum of labor difficulties, is disclosed in an exclusive statement made to THE IRON AGE by Philip Murray, SWOC chieftain. Mr. Murray says: "Powers of darkness that now seek to envelop a large part of these worlds will find in the United States a light too bright ever to be dimmed. Here we are united. The greater the danger that threatens us, the stronger we shall become in defense of the rights of free men. Naturally, the steel workers of the country expect every employer to do his duty. That the steel workers likewise will play their parts, whatever the emergency, needs no special emphasis. They are Americans, always willing to move in the sense of rights won on many battlefields. At this hour the SWOC and the hundreds of thousands of workmen it represents are willing to teach the war makers of the world a lesson in unity. Whoever looks for the American steel workers to close the mills by irresponsible, unreasonable strike now or in any future hour of still greater need, will look in vain. If the fight to save civilization is to be decided, in this age of steel, in the plants of industry, the steel workers are ready."

At Pittsburgh the CIO Steel City Industrial Union Council has started a movement to obtain a labor member on the newly created War Resources Board. P. T. Fagan, council president, said that labor is entitled to representation on the War Board along with business interests because millions of union members are directly affected by any action that might be taken.

Foreign Supplies of Tin and Alloys a Steel Industry Problem

ONE of the factors which will be of great concern to the American steel industry if the war is of long duration is the supply of essential materials which are obtained principally from foreign countries. Tin is one of these, and while there is said to be an ample supply in this country for some months, the ultimate supply situation, together with the cost of tin, is bound to be of major importance in the trend of tin plate prices.

Of scarcely less importance are the supplies of various alloying components of steel. In the World War some of the most drastic price advances affected such products when the difficulties of bringing them to this country increased. Certain changes since the 1914-1918 war have served to ameliorate the situation, but nevertheless the current hostilities must inevitably react unfavorably on the cost of some alloys, thereby adding to the cost of making high grade steels.

Manganese, an essential ingredient in most steels, is the weakest link in current American steel economy. Ferromanganese has already been advanced $20 a ton to $100, but is hardly expected to ever reach the $400 a ton price of World War times. The domestic manganese ore supply will likely expand under war conditions, just as it did in 1918, but this country will necessarily be a heavy importer. Russia, an important source, immediately becomes an untrustworthy source, and the Gold Coast in Africa, Brazil and India, all major sources of manganese ore, will remain open but subject to the usual extreme hazards and high costs of shipping. The brightest spot in the entire picture is the Cuban-American Manganese Corp. plant in Cuba, which has been developed since the 1918 war, and which now is capable of supplying over 10,000 tons of concentrates per month. Shipment of this material to American ports involves comparatively little risk. Another factor mitigating any immediate tightness is the excellent stock position of domestic users, who currently have apparent total supplies on hand in excess of any position ever held before.

Chromium, another extremely necessary ingredient in many steels, occupies a position quite similar to manganese. Domestic output, mostly from California, can likely be expanded to take care of, say, 20 to 25 per cent of the industry's needs, but the remainder must come from Rhodesia, Cuba, South Africa, Greece, Turkey and the Philippines. Naturally, ferrochrome prices will eventually reflect the tight situation in boats, high rates and insurance, but the supplies are all located in neutral countries. High carbon ferrochrome now sells for 10½c. per lb. of contained chromium, as compared with a World War maximum of 40c. per lb. Current stocks are fairly high, although high production would wear them down fast. It is possible, too, that under pressure Canada could revive its chromium production, but most of this would naturally be consumed there.

Nickel, still another most necessary alloying element, should reflect no great pressure. The price has just been reaffirmed at 30-32c. a lb., as against a World War maximum of about 50c. a lb. American production of nickel is negligible, being mostly a by-product recovery in the refining of copper. Canada is the source of practically all United States supplies of nickel. Quite large stocks of metal are kept on hand by domestic producers.

Tungsten, the last of the extremely strategic alloying elements, is likewise mostly an importation, although domestic producers have long claimed that with proper encouragement a considerable measure of self-sufficiency would be approached. The current price is about $18 a short ton unit, which includes quite a heavy protective import duty, as against a World War maximum of about $94 a unit, without a duty. War economy would inevitably drive up consumption, and at the same time prices. Domestic production will likely expand to a fair volume, but the bulk of imports will continue to come from China, which imports will certainly reflect the lack of free supply of ships, higher rates and insurance.

Molybdenum and vanadium, the former primarily a domestic product and the latter produced in part domestically and in part imported from Peru, present a picture which is at present not serious. Vanadium will likely reflect to some extent the rapidly rising shipping rates, but there is little likelihood of serious interruption in supplies.

National Metal Congress Show Date Is Unchanged

DESPITE business unsettlement following outbreak of the war in Europe, the National Metal Congress will be held at Chicago from Oct. 23 to 27, the dates originally scheduled.

An announcement from W. H. Eisenman, managing director, said the exposition "will in no way be affected by international affairs."

More than 200 exhibitors "express optimism at business prospects and additional orders for space are being received following the declaration of war," Mr. Eisenman said. Hotel reservations have increased and interest is high among the members as the show date approaches, he said.

Snow Cruiser Ready For Trip to Pole

EARLY this fall there will roll out of Chicago, bound for Boston under its own power, a gigantic 55-ft. 75,000-lb. Snow Cruiser which will combine all the qualities of a de luxe trailer, an armored tank and a scientific laboratory. This Snow Cruiser, designed and built at a cost of $150,000 by the Research Foundation of Armour Institute of Technology for fundamental research, is constructed of Inland Hi-Steel. It will be loaned to the United States Government for the projected Antarctic expedition which will lay South Polar claims.

At Boston the Snow Cruiser will be loaded on a freighter for New Zealand. There it will be transferred to a whaling vessel and taken into the Ross Sea area. It will be unloaded at Antarctica and will then proceed to the South Pole.

C. of C. Aghast at Misery And Slaughter Abroad

"WE business men, as all others, are aghast at the prospect of slaughter and misery abroad. We wish no profit advantage through the wrecking of great cultural and spiritual values which have been built painfully and slowly through generations of thought and effort. We want peace in the world," W. Gibson Carey, Jr., declared this week in a message to all members of the Chamber of Commerce of the U. S., which he heads.

"In order to fulfill our destiny nobly, we must solve our domestic problems. We are apt to forget that we ourselves are not at war and that, God willing, we shall avoid such a catastrophe. The essential thing is for us to build our national strength on self-discipline, productivity and good will. This is the time for maximum effort, great tolerance and fervent prayer."

Ferromanganese Up $20, Spiegeleisen $4

LATE last week quotations on 80 per cent domestic ferromanganese were advanced $20 a ton to $100. This price will rule on all fourth quarter contract business, but on spot sales it is subject to change without notice, making it possible that still higher prices may govern on spot buying before the end of the quarter. Other changes in ferroalloy prices announced this week by a leading producer are as follows: 19 to 21 per cent spiegeleisen, up $4 to $32; 26 to 28 per cent spiegeleisen, up $6.50 to $39.50; silicomanganese, $15 higher on all grades, and electric furnace ferrosilicon, 15 to 20 per cent, $5 a ton higher. Adjustments have also been made in prices of some of the special alloys. Third quarter ferrochrome and electric ferrosilicon prices were announced unchanged for fourth quarter business. Earlier in the week current prices of bessemer ferrosilicon and silvery iron were reaffirmed by the Jackson producer.

The Sloss-Sheffield Steel & Iron Co. announces that its No. 4 blast furnace at North Birmingham will be put in blast immediately for the manufacture of high-grade ferromanganese.

Steel Cartel Has Issued No Statement Regarding Its Future Functioning

LONDON, Sept. 12 (*By Cable*)—No statement is obtainable from Cartel officials in London regarding the continued functioning of international steel arrangements. They say it is too early to take any definite view as to how the agreement will be affected by recent events, but the Belgian steel trade takes the view that the Cartel has virtually ceased to exist.

The Belgian steel industry is hard hit by hostilities. Operations are reduced and there are serious difficulties regarding ore supplies.

British prices are unchanged. Continental prices are nominal.

Booklet On Bar Bond Tests

CHICAGO—The Concrete Reinforcing Steel Institute, Builders Building, Chicago, has published in pamphlet form the report on "Rusty Bar Bond Tests and High Yield Point Steel Research." Compiled by A. E. Lindau, chairman of the engineering practice committee, this report was originally delivered at the 1939 annual meeting of the institute at Augusta, Ga. A limited number of copies are available to members on request from the institute headquarters.

Weir to Address Steel Construction Institute

THE American Institute of Steel Construction will hold its 17th annual convention at the Waldorf-Astoria Hotel in New York City on Oct. 17-18. Delegates from all the important shops fabricating and erecting structural steel shapes in the United States will be present. E. T. Weir, chairman, National Steel Corp., will make the banquet address on Tuesday evening, Oct. 17. There will also be two special luncheon meetings. That on Oct. 17 will be addressed by A. D. Whiteside, president, Dun & Bradstreet, and that on Oct. 18 will be addressed by Paul G. Hoffman, president, Studebaker Corp.

NLRB Orders DeKalb Union Disestablished

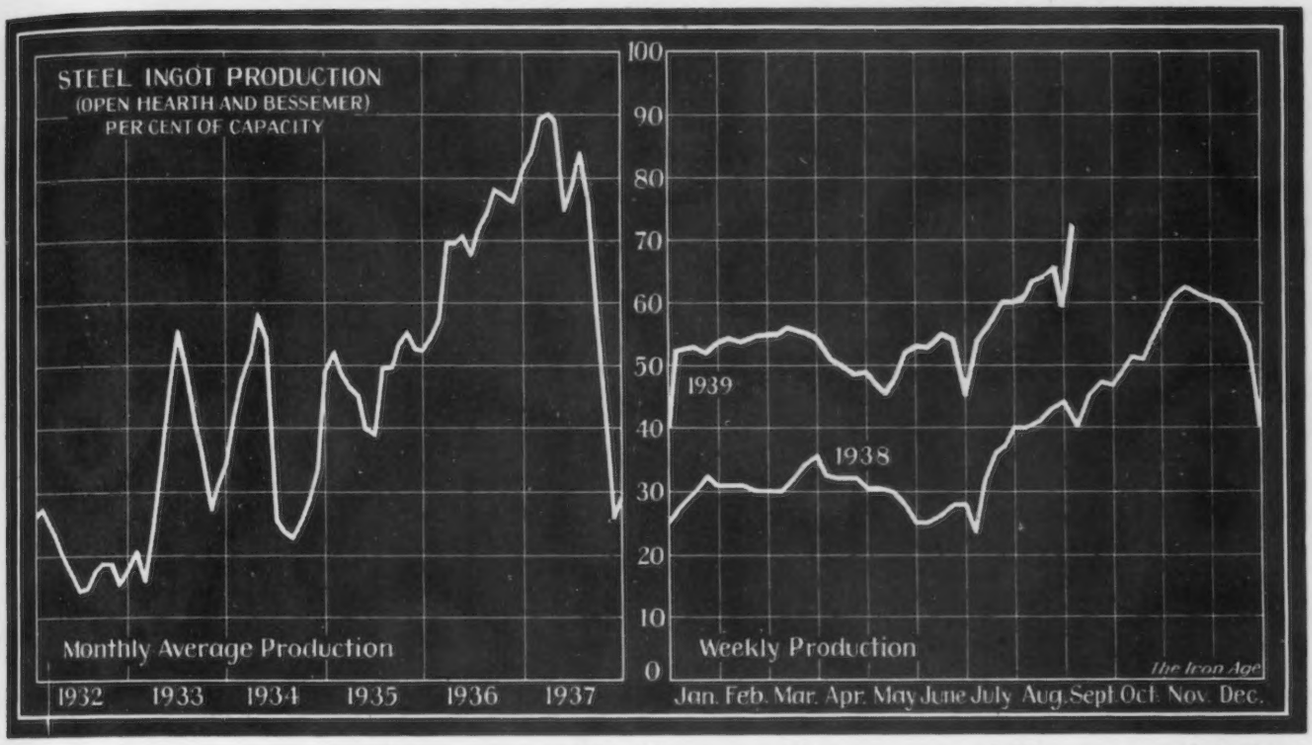
WASHINGTON—The National Labor Relations Board has ordered Auburn Foundry, Inc., Auburn, Ind., to disestablish the DeKalb Iron Workers Association, Inc., which the board said was dominated and supported by the company.

The company was ordered to "stop discouraging membership in Lodge 1998 of Amalgamated Association of Iron, Steel & Tin Workers of North America (CIO)." The board also ordered the reinstatement of two men with back pay but concurred in finding of the board's trial examiner that there was no discrimination in the company's failure to reemploy one worker.

To determine whether production and maintenance employees of the company desire to be represented by the Amalgamated, the board directed that a secret ballot election be held after it is satisfied that effects of the unfair labor practices by the company have been dissipated. Charges of violation of the National Labor Relations Act were filed by the Amalgamated which also asked the board to certify it as exclusive representative for collective bargaining.

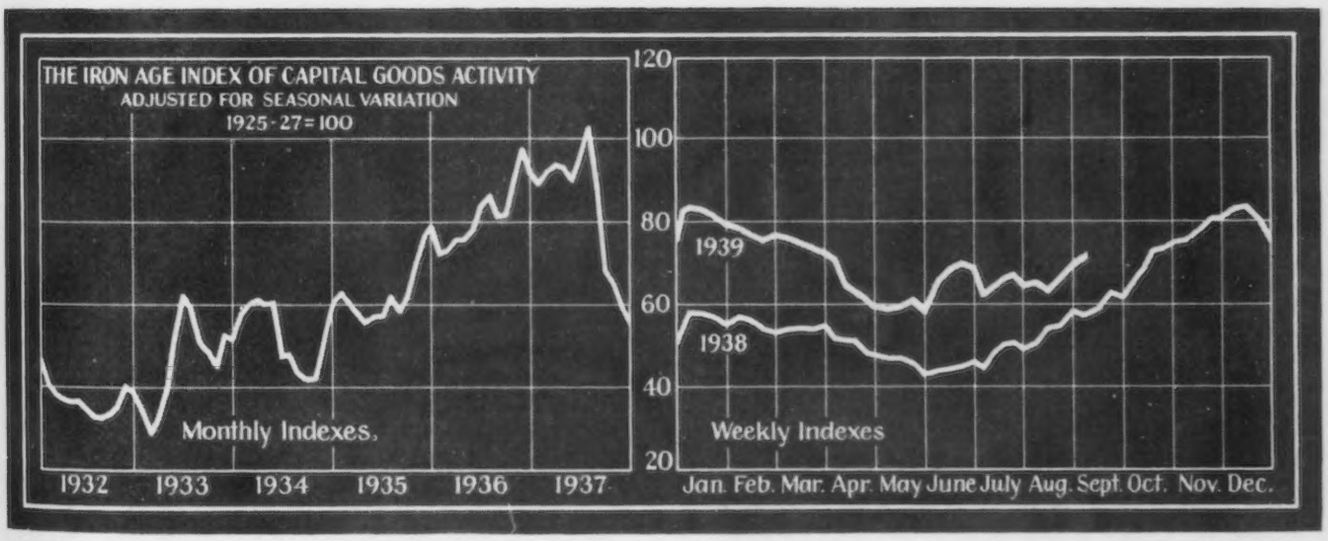
The board has announced dismissal of a petition for investigation and certification of representatives filed by the Pattern Makers' Association of Pittsburgh and vicinity, Pattern Makers' League of North America, affiliated with the AFL on behalf of employees of the Walworth Co., Greensburg, Pa.

Ingot Output Jumps 12 Points to High of 71%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	69.0	67.0	74.0	51.0	82.0	66.0	73.0	97.0	82.0	62.5	54.0	52.0	75.0	**71.0**
PREVIOUS WEEK..	53.0	51.0	53.0	43.0	70.0	61.0	78.0	97.0	78.0	59.0	50.0	52.0	70.0	**59.0**

Holiday Fails to Halt Upward Movement of Index



THE gradual increase in the output of the heavy industries, first noticeable in the early part of August, continued in the past week without the usual slackening for the Labor Day holiday, according to THE IRON AGE index of capital goods activity. At the end of the past week, the index stood at 71.5, a gain of 1.3 points over the preceding week and the highest weekly position since April 1. The past week's gain is in contrast to a loss of 1.5 points in the holiday week of 1938 and 15.0 points in the 1937 week. Steel output was off slightly in the week, but was counteracted by a spurt in automobile assemblies. Both lumber carloadings and activity in the Pittsburgh area were at a higher pace in the week, but the volume of heavy construction contracts awarded declined somewhat. Despite the loss in the short week's awarding of construction contracts, the total for the year to date is 16 per cent above the corresponding period of 1938.

	Week Ended Sept. 9	Week Ended Sept. 2	Comparable Week 1939	Comparable Week 1929
Steel ingot production[1]	89.7	96.8	59.0	120.7
Automobile production[2]	58.8	46.1*	48.9	96.6
Construction contracts[3]	66.7	70.6	68.1	121.6
Forest products carloadings[4].	59.3	57.0	53.7	125.0
Production and shipments, Pittsburgh District[5]	82.9	80.5	55.0	106.7
Combined index	**71.5**	**70.2***	**56.9**	**114.1**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.
*Revised.

. . . SUMMARY OF THE WEEK . . .

. . . Steel buying in heavy volume; ingot rate rises to 71 per cent.

° ° °

. . . Steel companies restricting purchases in effort to control situation.

° ° °

. . . Steel scrap $2 higher at Pittsburgh; further advances seen.

A TREMENDOUS volume of steel orders, almost unprecedented within so short a period, has been piling up on mill books since the outbreak of war in Europe. Bookings of the past week have greatly exceeded those of the week before, the totals in some products, particularly sheets and bars, assuming almost fantastic proportions and resembling the mad rush to buy in the early part of 1937 in anticipation of steel strikes.

Business has come in so fast as virtually to swamp the sales and clerical force of steel companies. Under the circumstances an accurate estimate of total bookings of the past 10 days is impossible, but some products have gained from 35 to 200 per cent over their weekly averages of August. For example, a New York sales office of a large company in three days booked as much domestic business as in the entire month of August.

Comparatively little of the heavy inflow of tonnage has come from abroad. Export business has expanded, but not as greatly as domestic buying, the chief hindrance being the shipping situation.

The sharp gain in business has been accompanied by a quick rise in steel ingot production to 71 per cent, a gain of 12 points over the Labor Day holiday week, and advancing scrap prices, which have raised THE IRON AGE scrap composite price to $16.75, a gain of $1.13 to the highest level since early October, 1937. Heavy melting steel at Pittsburgh is $2 higher and there have been lesser rises in other markets.

PIG iron production is also being increased both for steel making and merchant trade, presaging a further rise in steel making operations on the one hand and greater foundry activity on the other. The Carnegie-Illinois Steel Corp. has blown in five furnaces, three in the Pittsburgh district and two in the Chicago district; the Jones & Laughlin Steel Corp. has blown in one and the Republic Steel Corp. one at Birmingham. The Hamilton, Ohio, merchant stack of the American Rolling Mill Co. has gone in, while this week Sloss-Sheffield and Woodward Iron will each add a furnace, the former to make ferromanganese.

Owing to advances in raw material costs, steel companies have withheld announcement of fourth quarter prices until the situation could be more clearly appraised. These announcements may come this week. No general increase is expected, but adjustments may be made to cover additional costs that have already been incurred, such as the higher spelter prices which will run up costs of making galvanized sheets.

Whatever prices are named probably will be on an "until further notice" basis, subject to change within the fourth quarter if conditions warrant. This is seen in the announcement of the extension of the current price of $5 per base box on tin plate, but the rise in the tin price to 75c. per lb. raises doubt as to the long continuance of this quotation. Demand for tin plate has risen contra-seasonally and operations have been lifted to 68 per cent, with the prospect that added foreign and domestic business will bring still higher production.

There is patently a disposition among steel companies to do all in their power to prevent a runaway market both in the matter of price advances and in the restriction of purchases that can be identified as of a speculative character. In some products, notably semi-finished steel and bars, the mills have virtually allocated tonnage to various consumers, cutting down the size of orders when they appeared to be excessive in relation to normal requirements.

A considerable share of business booked in the past week consisted of sheets and strip which were taken at low prices last May. All mills insisted on complete specifications by mid-September, and the result has been to load some mill books with about all the flat rolled tonnage they can produce over the remainder of the year. However, new business in sheets and strip has been booked for immediate shipment at current prices. When forced to do so by insistent customers, steel companies have taken business for later shipment with prices ruling at the time to govern, but there has been a disposition to avoid such commitments if possible until fourth quarter prices are announced. In all events, mills are trying to limit orders for completion before the year-end.

MERCHANT pig iron producers are taking contracts for the fourth quarter at no change in price and have booked heavy tonnages. Ferromanganese prices have been advanced $20 a ton to $100, Spiegeleisen is up $4 a ton to $32 for the 19 to 21 per cent grade, and fluorspar is $1 to $2 a ton higher. Trading in foreign ores is at a standstill, but stocks in this country are ample for some time to come.

Meanwhile, various steel using industries are being greatly stimulated. The automobile industry, headed into its 1940 model production year, expects considerable truck business from abroad and is taking steel heavily for fall production of cars. Railroads are opening their shops for the repair of cars and locomotives to take care of an expansion in carloadings. Inquiries for new cars and locomotives are expected. The Erie is considering the purchase of 900 cars and a number of locomotives, the Norfolk & Western is rebuilding 1000 hopper cars and the Virginian will build 500 in its own shops. Supplementary rail buying includes 30,000 tons for the Louisville & Nashville, 5000 tons for the Seaboard Air Line and 2000 tons for the Illinois Central, all placed with the Tennessee Coal, Iron & Railroad Co., which is starting up its Ensley rail mill.

Shipbuilding will continue to boom. Bethlehem has been awarded 10 ships and the maritime commission has asked for bids on 33 additional, requiring 160,000 tons of steel.

No falling off in structural steel business is expected even though government-financed jobs should taper off, as there will be fresh demands from private industry.

ORE shipments on the Great Lakes are being speeded up, about 30 ships having been added to the ore-carrying fleet. The season's shipments are expected to total about 43,000,000 tons.

Though British and Belgian steel interests are unable to foretell the future functions of the International Steel Cartel, the Steel Export Association of America will continue to cooperate with the Cartel insofar as war conditions permit.

Repeal of the Neutrality Act, which is confidently expected in well-informed circles, undoubtedly will add to industrial activity here if the war is of long duration. Labor's full cooperation in the tense period which lies ahead for the steel industry is assured by Philip Murray, head of the Steel Workers Organizing Committee, who states to THE IRON AGE that "whoever looks for the American steel workers to close the mills by irresponsible, unreasonable strikes now or in any future hour of still greater need, will look in vain. If the fight to save civilization is to be decided, in this age of steel, in the plants of industry, the steel workers are ready."

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Sept. 12, 1939	Sept. 5, 1939	Aug. 15, 1939	Sept. 13, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.40	2.40	2.40	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.25	3.25	3.25	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.25

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$21.84
No. 2, Valley furnace	21.00	21.00	21.00	20.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	20.06
No. 2, Birmingham	17.38	17.38	17.38	16.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	20.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	21.34
Basic, Valley furnace	20.50	20.50	20.50	19.50
Malleable, Chicago†	21.00	21.00	21.00	20.00
Malleable, Valley	21.00	21.00	21.00	20.00
L. S. charcoal, Chicago	28.34	28.34	28.34	28.34
Ferromanganese, seab'd carlots	100.00	80.00	80.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	$18.25	$16.25	$16.25	$15.25
Heavy melting steel, Phila.	17.25	16.75	16.25	14.25
Heavy melting steel, Ch'go.	14.75	13.875	13.875	13.75
Carwheels, Chicago	13.75	12.75	12.75	14.25
Carwheels, Philadelphia	17.25	16.25	16.25	17.25
No. 1 cast, Pittsburgh	18.25	16.00	15.75	15.50
No. 1 cast, Philadelphia	17.75	16.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	13.75	12.75	12.75	13.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.75
Foundry coke, prompt	4.75	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, Electrolytic, Conn.	12.00	12.00	10.50	10.125
Copper, Lake, New York	12.00	12.00	10.50	10.25
Tin (Straits), New York	75.00	59.00	48.75	42.75
Zinc, East St. Louis	6.25	5.75	4.75	4.75
Zinc, New York	6.24	6.14	5.14	5.14
Lead, St. Louis	5.35	5.10	4.90	4.75
Lead, New York	5.50	5.25	5.05	4.90
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Sept. 12, 1939	2.236c. a Lb.	$20.61 a Gross Ton	$16.75 a Gross Ton
One week ago	2.236	20.61	15.62
One month ago	2.236	20.61	15.46
One year ago	2.300	19.61	14.42

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16			$16.75, Sept. 12	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

NEW BUSINESS

. . . Tremendous volume of buying swamps steel companies

STEEL specifications have been pouring in so rapidly in the past few days that any accurate estimate of the volume is impossible at this time. It is apparent, however, in PITTSBURGH that the aggregate volume of steel business at the beginning of the week was in some cases actually double the amount booked in the previous week. Estimates on some products show that bookings have expanded from 35 to 200 per cent in excess of recent weekly averages. There is already some evidence that mills are allocating total supplies and that regular customers are being taken care of as well as can be done under existing circumstances.

It is understood that most of the present specifications are releases against contracts and old commitments, but a fair volume of fresh business has been booked in every line. Such new business, however, is being held down as much as possible pending expected price announcements. It is hardly likely that steel companies are booking any more new business than can be got out in the next month, and it is known that all such orders are to be shipped at the mill's convenience. Furthermore, the certainty of a tremendous increase in demand from the automotive industry will only serve to complicate more production problems at the mill and new business.

Early this week there were indications some mills will be forced completely out of the market for awhile, at least until clarification of prices if not for a longer period of time.

Two weeks after the start of the European war, CLEVELAND and YOUNGSTOWN steel mills are booked to capacity and delivery promises are growing more extended day by day. The demand which arose simultaneously about Sept. 5 from all classes of buyers, most of them seeking frantically to build up depleted inventories, exceeded in intensity any previous buying wave in the recent history of the industry.

On Tuesday of this week the clamor continued as strong as ever, according to most sellers at Cleveland. It is expected there will be a slowing down from the hectic condition existing from Sept. 5 to 12, although demand will remain well above normal for awhile due to the delivery situation.

The enforced withdrawal of European mills from their normal markets has diverted export business in large volume to America and export prices have risen swiftly. One Cleveland producer received 85 cables in two hours last Wednesday. Billets and ingots were in particularly good demand, followed by tubular goods.

At times the situation approached chaos, but all producers attempted to discourage speculative buying and at the same time expressed the desire to supply normal domestic needs ahead of foreign demand. Fear of tieups on seaboard piers is expressed. Contracts are avoided wherever possible and when accepted are subject to the former practice of equal monthly tonnages. All mills at the end of last week would accept tonnage on the basis of price prevailing at time of shipment. Sheet and strip tonnage under current prices was limited to acceptance before Sept. 16 for shipments at mill's convenience, and it was stipulated bar tonnage entered for shipment at mills on convenience and unshipped Oct. 31 would take the price in effect on that date. Flexibility is likely to be necessary, however. Inquiries of 10,000 to 50,000 tons were not uncommon.

Pig iron producers encountered intense demand, also. Indications point to higher pig iron prices. Iron ore and all other raw materials became very active while scrap prices soared. Steel producers themselves, like their customers, sought to obtain protective tonnages.

A tremendous volume of orders has been pouring into CHICAGO sales offices since the middle of last week. This frenzied burst of activity has been felt all along the line—finished steel products, semi-finished and pig iron. Specifications against low priced sheets have been received from virtually all general buyers, while a deadline of Dec. 1 has been set for automobile makers.

Speculative buying is being watched carefully by most mills, and orders are not being taken where shipment by Oct. 1 or soon thereafter is impossible. Seldom has there been so much indefiniteness expressed as to the trend of a price announcement as today. Although prices for fourth quarter may be known by the time this issue reaches its subscribers, at this writing most people will not even guess as to the probable changes.

In the face of an impending car shortage, several western roads are figuring car programs. Award of the Northwestern's 800 cars is expected soon. A few additional rail tonnages may be placed around Oct. 1.

To date, mostly tin plate has been exported from Chicago mills, and this all went to South America. Inquiries have been received from abroad for pig iron but producers are not interested at this time.

ST. LOUIS reports that new business is rolling in for nearly all commodities, with the volume placed being estimated to be the best since the early days of 1937. The principal item is hot and cold rolled sheets. Nearly all orders are for prompt shipment, and doubt is expressed that all of the material ordered can be shipped during the short remaining time of the third quarter, and mills are accepting no business for fourth quarter.

Buying in NEW YORK and PHILADELPHIA in the past week reached startling proportions as practically all consumers endeavored to obtain coverage through the next quarter. Mills, however, restricted bookings to such tonnages as were considered "normal" and with the understanding that all tonnages must be shipped before Sept. 31, with the exception of pig iron which is being sold for delivery through the fourth quarter. Estimates on the total amount of steel placed in the week vary from six times the average week of the past two months to double the average week.

Pacific coast customers have increased their purchases in anticipation of higher prices and the possibility of a complete dock tie-up in the near future. Some fabricators are reportedly working at full capacity.

PRICES

. . . Announcement of fourth quarter quotations expected soon

THE previous opinion that fourth quarter prices would be generally unchanged seems untenable in view of recent events. Raw material costs are advancing rapidly and this factor alone is probably more responsible than any other for the delay in announcing fourth quarter prices. Announcement covering a new list of quotations is expected soon but there is every indication that steel makers

hope to prevent a runaway market and restrict such advances as might be made to cover actual conditions, such as raw material price advances, which have occurred in the past fortnight.

Some inequality and unbalance in the steel price structure which became existent in 1938 as the result of an intense price competitive period coupled with poor demand may be rectified also. Furthermore, with tin plate prices having been placed on a modified spot basis it is expected that quotations for other steel products, when announced, will likewise be on an "until further notice" basis.

Tin plate makers last week told their customers that until further notice current prices would rule tonnage for fourth quarter delivery.

The disposition by some makers to advance the base price of hot rolled sheets, as mentioned last week, in order to equalize the price of certain hot rolled pickled annealed sheets with certain gage mill run cold rolled sheets remains as a definite probability.

There continues to be talk of an advance in pig iron prices, and though some producers are booking fourth quarter contracts at unchanged prices.

The domestic price of ferromanganese has been raised $20 a gross ton to a flat $100 for the 80 per cent grade in carlots, effective at once on spot business. The price is on an "until further notice" basis.

Pig iron for export has brought as high as $21 a gross ton in the last 10 days. Meanwhile ocean freight tariffs have been soaring.

Fluorspar prices are $1 to $2 a ton higher.

OPERATIONS

... Steel making rate up to 71 per cent . . . Many blast furnaces blown in

STEEL ingot production this week has risen 12 points to 71 per cent, according to THE IRON AGE estimate. Almost every district has made a gain. The Pittsburgh rate is up 16 points to 69 per cent, which is 11 points above the rate of the week before Labor Day. A further advance there is held to be likely as soon as additional blast furnace capacity has been brought into use.

The Chicago district is also up 16 points over last week to 67 per cent, the highest rate therein since the last week of September, 1937. Sharp gains are shown in Ohio steel production. The Cleveland-Lorain rate is up 12 points to 82 per cent and the Youngstown rate is up 21 points to 74 per cent.

Eastern Pennsylvania is making steel at a 51 per cent rate, but finishing mills are operating on an even higher basis. The Birmingham district is at 82 per cent. Other districts have made lesser gains.

The only major district to show a loss is Wheeling-Weirton, but that is merely a temporary situation caused by the taking off of a Bessemer converter.

Carnegie-Illinois Steel Corp. has added five blast furnaces, three in the Pittsburgh district and two in the Chicago district. The Jones & Laughlin Steel Corp. has added one, the Republic Steel Corp. has put one on in the Birmingham district and the merchant stack of the American Rolling Mill Co. at Hamilton, Ohio, has gone in. Sloss-Sheffield Steel & Iron Co. and Woodward Iron Co. will each put one in blast this week in the Birmingham district, Sloss-Sheffield to make ferromanganese. It is expected that blast furnace activity will be expanded much more owing to high prices of scrap.

PIG IRON

. . . Orders in larger volume . . . Fourth quarter contracts being taken at unchanged prices

PIG iron producers have opened their books for the fourth quarter at unchanged prices. Although there has been talk of a price advance, none has yet materialized, except for export, quotations for shipment abroad having been generally advanced to the domestic level. Some small export orders have been booked, but trading is hampered by the difficulty of obtaining vessel space.

Pig iron sales at PITTSBURGH have expanded substantially in the past week. Shipments have also stepped up and many producers have booked all the tonnages they care to take at present published prices. Many contracts have been made with regular customers for fourth quarter deliveries at the present prices. Meanwhile integrated steel companies continue to blow in steel making stacks. Carnegie-Illinois is blowing in three furnaces in the Pittsburgh district, one at Duquesne works, one at Carrie furnaces and one at Farrell works, making 21 active furnaces for this producer in the PITTSBURGH district. Jones & Laughlin Steel Corp. has blown in an additional furnace at its Pittsburgh works, making a total of nine out of 11 in blast for that company.

Ordering in the CLEVELAND and YOUNGSTOWN districts also has been heavy at the $21 basis. Melters ordinarily using high scrap ratios suddenly found scrap markets tightening after the outbreak of hostilities in Europe and quickly decided to put money into pig iron, thus building up inventories sadly depleted for well over a year. Rumors of heavy export buying have not been confirmed at CLEVELAND. Several inquiries ranging around 5000 tons each have come out and were quoted at the full domestic price level. However, CLEVELAND producers are more interested in taking care of domestic demand, especially since great difficulty appears likely in obtaining vessels for possible shipments abroad and since vessel rates are uncertain. It is generally felt among pig iron buyers and producers that the market is definitely heading toward higher price levels.

CHICAGO shipments in September probably will double those of August, according to some sellers there. Foundry coke movement is up to 20 per cent and better over last month, this figure affording a fairly good picture of district foundry activity. Demand is very heavy, but speculative buying is being controlled. An additional merchant stack is scheduled to go into blast about Sept. 25. Carnegie-Illinois put blast furnaces in operation this week at Gary and South works, making the district total 21 in blast.

BIRMINGHAM producers also report a most active week. A considerable amount of new tonnage was booked and the activity is expected to continue this week. Pig iron production is being increased. Over the week end Republic Steel Corp. blew in its No. 2 stack at Thomas. This had been out for relining. All three of the Republic furnaces are now in production, two in Birmingham, one in Gadsden. Woodward Iron Co. has announced that it will blow in its No. 3 furnace the latter part of the week. All three of Woodward's will then be in operation. Sloss-Sheffield Steel & Iron Co. has announced that it will blow in its No. 4 furnace at North Birmingham within the next week on ferromanganese. Sloss-Sheffield is now operating two of its four furnaces.

At ST. LOUIS sales are being made on the basis of present prices. Sales have been heavy, melters being in-

clined to make commitments not only for their immediate requirements but to build up their piles, something they have not done for some time. It is expected that September shipments will be the largest for any month this year.

The war has stimulated a sharp increase in demand for pig iron in the CINCINNATI area, but consumers are generally only asking for fourth quarter coverage. Foundries generally indicate that they are placing themselves in a position to be ready to take care of an increased demand for castings.

EASTERN PENNSYLVANIA producers have opened fourth quarter books without formal announcement and are accepting orders for that period at current prices. There has been very heavy buying over the past week, with orders for 1000 tons fairly numerous. Actual melting schedules have shown little change over the past few weeks, but the general low state of consumer's inventories intensified the demand to the point where some sellers were forced to restrict bookings, in most cases to tonnages which experience had indicated could be used in the quarter.

Many of the larger foundries in the NEW YORK selling area which had made commitments for upward of several thousand tons just before and after the declarations of war abroad placed repeat orders of like amount early this week.

The outbreak of war brought a buying movement at BOSTON not witnessed in years. Sales the past week aggregated 16,000 tons in lots of 75 tons to 1000 tons. The flood of buying orders is still engulfing furnace representatives, and indications are sales for the current week will equal or better those for the past week.

FLUORSPAR

. . . Prices have advanced $1 and $2 a ton

CONSIDERABLE spar has been bought for prompt delivery in the past two weeks. Prices have jumped $1 or $2 a ton and will probably go farther, but the market has not settled down enough so that published quotations can be ascertained with any degree of accuracy. Deliveries desired and quantities asked are important factors in establishing the price.

SEMI-FINISHED STEEL

. . . Orders pouring in . . . supplies being allocated

SEMI-FINISHED steel specifications are pouring in. A large part of this volume of business represents releases from non-integrated sheet and strip mills against old commitments. In addition to this type of business there has been an extra volume of miscellaneous requirements, and there have already been inquiries from foreign countries whose original source of supply has been cut off due to war conditions. Wire rod makers also report an exceptionally heavy inflow.

CLEVELAND reports heavy demand from forgers and non-integrated steel producers, and strong inquiry from abroad. Export prices appear likely to reach the premium stage soon. Domestic orders are being restricted pending price clarification. Illustrative of this trend, one inquiry for 10,000 tons of billets was cut down to 2000 tons. Some mills' backlogs on billets are three to four weeks.

SHEETS AND STRIP

. . . Flood of orders brings mill restrictions on bookings

SHEET and strip orders in the past week have risen substantially at PITTSBURGH and specifications are still pouring in. Orders are coming from all directions. There has been a noticeable increase in specifications from the automobile industry. Miscellaneous buying has also stepped up, but it is true that most of the orders are releases against old commitments. Some new business has been taken at prices prevailing at time of shipment but there is a disposition among mills to hold down on fresh business. There is more than likely to be advances in price for those sheets that use raw materials such as zinc because of higher prices for these metals. It is also expected that hot rolled sheets will go up at least $2 a ton, as mentioned last week.

A barrage of orders starting Sept. 5 quickly boosted sheet mill backlogs at CLEVELAND. Many consumers endeavored to cover for long periods ahead, but sellers clamped down on speculative tonnages wherever possible and made orders subject to shipment at mill's early convenience. Despite these and other restrictions, bookings of one CLEVELAND district sales office ranged well over 5000 tons per day. At the end of the week delivery promises of most sellers generally ranged from four to six weeks, with cold rolled sheets and narrow strip being farthest extended. Automotive parts makers were ordering freely, and large releases direct from the Michigan manufacturers themselves were expected. The galvanized sheet market was firm at 3.50c. and buying was heavy. The rise in spelter spurred buying.

In a flurry of orders last week and this, CHICAGO district buyers protected themselves against possible price advances and lengthy deliveries. So great has been the demand that by early this week virtually all the specifications against last May's low priced sheets and strip had been received by mills from non-automotive customers in that area. Some sheet mills are already filled for the remainder of this quarter, and the shipment of low priced sheets will extend into October. Automobile companies are being asked to have their specifications in by Dec. 1. Releases are general from the entire consuming trade, as inventories were very low. Some mills are not permitting speculative buying, insofar as it can be controlled. Assuming continuance of the persistent demand from abroad, a strong possibility exists for the export of sheets and strip from the CHICAGO district. The sheet and tin mills at one plant there are operating this week at about 78 per cent of normal capacity. Increases over last week were made in the hot sheet mill, galvanizing shop, sheet cold reduction, tin house, and tin cold reduction.

Demand for sheets in the CINCINNATI area was about equal to mill capacity during the past week. Automotive demand is increasing steadily and the miscellaneous requirements have broadened.

Some of the smaller mills, owing to abundant domestic demand, are out of the export market for the present and are declining to quote on inquiries, which are numerous.

Overnight, the NEW YORK market as elsewhere has become a sellers' market. Business offered from other than regular customers is being turned down and tonnages for the latter allocated. Some orders are being booked at a price prevailing at time of shipment, but this practice is not universal.

REFRACTORIES

. . . Orders for fire brick expand
. . . Higher prices expected

REFRACTORY makers have noted an exceptional increase in both orders and inquiries in the past week. Steel mills are rushing blast furnaces into operation and many of these need extensive repairs. Meanwhile most steel companies have little or no supplies of brick. Likewise inventories at brick makers' plants are not overly large. It is understood that refractory brick companies are only accepting those orders which can be shipped by the end of this month and are taking no new business for fourth quarter shipment until a new list of prices is announced. Many quarters in the trade look for higher prices in the near future.

TUBULAR GOODS

. . . Pipe sales have gained about 25% over week ago

ALTHOUGH the pickup in pipe sales in the past week has not been as great tonnagewise as has been noted in other steel products, the improvement in relation to the amount of pipe tonnage reaching the mills a week ago has been marked. Further increases in bookings are expected as soon as consumers realize the condition of raw steel supplies at steel companies where allocation of steel to various product departments has already been made in some cases. Pipe makers have noted a fair increase in export oil country goods business from countries that had been obtaining supplies from nations which are now at war. A rough estimate indicates that pipe sales in the aggregate have improved in excess of 25 per cent from a week ago.

Inability of foreign steel mills to supply their normal export markets has diverted inquiries for thousands of tons of pipe to American mills recently, according to sellers at CLEVELAND and YOUNGSTOWN.

BOLTS, NUTS AND RIVETS

. . . Sellers hesitant in making fourth quarter commitments

JOBBERS and consumers are showing a strong disposition toward anticipatory buying but producers at CLEVELAND so far are hesitant to make fourth quarter commitments. One large CLEVELAND manufacturer withdrew all prices outstanding as of Aug. 31 and had not made any reinstatement at the start of this week. The only recent price advance has been a 7 per cent increase in machine screws. Cap screw manufacturers, awaiting steel prices like bolt and nut producers, are not offering contracts and are restricting shipments. Present backlogs indicate September will exceed August, which was one of the biggest months from the standpoint of dollar sales since the fall of 1937.

REINFORCING BARS

. . . Awards total 4300 tons . . . Prices firmer

REINFORCING steel awards total 4300 tons and include 1040 tons for a dam at Franklin Falls, N. H., and 1000 tons for a reservoir at Grand Rapids, Mich.

New reinforcing steel projects of 3575 tons include 1000 tons for grade elimination at Louisville, Ky.

PITTSBURGH producers note that tonnages are still holding up. The tremendous upsurge in demand for other steel products has tended to preclude any weakness in the present price structure and published prices are being obtained with little or no deviation.

General contract for a Navy power plant and storehouse at Alameda, Cal., was let to K. E. Parker Co., San Francisco. The project is now believed to require more than 1500 tons of reinforcing steel.

State of Missouri will open bids on Sept. 22 for highway projects which will require approximately 500 tons of reinforcing bars and mesh. Highway work in Illinois has been at a standstill since Aug. 1 on account of a wage and hour law, on which there are conflicting views as to its effect on road work.

MERCHANT BARS

. . . Heavy buying points to possibility of allocation

HOT rolled bar sales at PITTSBURGH have expanded tremendously in the past week and the gain is continuing. Much of the improvement is the result of contract customers taking steel before Oct. 1 when extra changes, announced sometime ago, go into effect. While a large part of the current increases have come from miscellaneous sources, automotive buying has stepped up considerably in the past week. Bar production is climbing daily and the same is noted for shipments. As soon as prices are announced, which action is looked for this week, it is evident that another influx of orders will materialize as many steel companies have turned down new orders pending the price announcement.

(CONTINUED ON PAGE 115)

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Sept. 12, 1939	Sept. 5, 1939	Aug. 15, 1939	Sept. 13, 1938	1939	1938
Fabricated structural steel awards	19,100	9,250	10,745	17,300	693,925	536,035
Fabricated plate awards	3,145	1,640	1,105	470	115,615	96,490
Steel sheet piling awards	18,600	2,375	815	0	67,080	32,235
Reinforcing bar awards	4,300	9,610	4,055	7,700	329,570	226,665
Total Letting of Construction Steel..	45,145	22,875	16,720	25,470	1,206,190	891,425

IRON AND STEEL SCRAP

SEPT. 12—There has been no sizable mill buying in the past week, but all markets are extremely tight and a reluctance to part with material is noted all along the line. Yard dealers particularly are holding out for higher prices. As a result prices are soaing to new high levels. The composite price for No. 1 steel is up $1.13 to $16.75, comparable to figures prevailing in October, 1937. Price changes are occurring so rapidly, however, as to be out of date within a few hours. Based on small sales at Pittsburgh, No. 1 steel is up $2 a ton and all items on the list have been likewise affected. At Chicago, No. 1 is up an average of almost $1 to a $15 top, but brokers feel that were a mill to buy, at least $16 would have to be paid. Mills in eastern Pennsylvania cannot buy steel at any figure, and in the absence of trading, No. 1 is nominally up 50c. there. Items on which trading has occurred are up $1. Mill sales at Buffalo have pushed the market up $1, and at both St. Louis and Cincinnati, short coverages have raised buying prices a like amount.

Pittsburgh

The expected rise in scrap prices has occurred and most prices have become nominal owing to swift changes in the situation. Heavy melting at the time of going to press on Tuesday was quotable at $18 to $18.50, up $2 a ton based on actual sales or firm offers from consumers. Such sales have been small as no broker or dealer is selling anything which is not or cannot be covered. Advances have been made all along the line. Exceptional strength is noted in blast furnace grades as well as low phos grades. Many consumer sales are being made as much undercover as possible, and it is understood that some consumers are buying on open orders, that is, the broker or dealer is selling to the consumer as soon as he has located the material and covered it, and not until then. Railroad heavy melting steel has been bought by brokers and also sold into consumption within the past few days within a range of $20 to $20.50 a ton.

New York

Artificial restriction in supplies has necessitated an advance of $1 in buying prices for material delivered to barges for export. This means that unfilled orders to Europe are now being covered at a loss. Meanwhile steamers are extremely scarce, and some brokers have no boats loading at present. It is understood that the Japanese have bought material for shipment out of the Gulf at prices several dollars above previous contracts, but apparently no business has been placed locally at such figures. Cast grades on cars for eastern Pennsylvania delivery are up sharply in line with recent mill sales.

Chicago

Scrap here is very tight and brokers are paying $15 for heavy melting steel but as yet the leading buyer has not paid over $14. This mill is understood to have offered $14.75 but there are no takers. Brokers state that at least $16 will have to be offered before they will sell and in some cases $16.50 is the selling figure. It is almost impossible to buy a large tonnage of scrap today. All this year one district mill has dominated the scrap picture here, because it has been the only consistent buyer. This condition is expected to change soon, however, as operating rates are rising so rapidly that scrap purchases will probably be necessary shortly by other mills. Heavy melting steel this week is quoted at $14.50 to $15 a gross ton, delivered.

Philadelphia

The events of the past two weeks have completely disrupted normal trading here and has created an atmosphere of bullishness among the brokers such as has seldom been witnessed. These developments have aggravated the scarcity of material, with even the smallest accumulators holding back supplies in anticipation of higher prices. Brokers are experiencing great difficulty in covering on old orders. Those holding export contracts are in a particularly difficult position, being unable to obtain material despite offerings at around $1.50 to $2 above the price covered by the contract. Mills have been unable to obtain offerings on melting steel from brokers for the past week. Brokers have indicated, however, that they expect $17.50 to $18 to rule on No. 1, once the present confusion subsides, although the difficulty of securing bottoms at New York and other points may cause some tonnages intended for export to be deflected to eastern Pennsylvania. There have been several sales recently of cast items and some railroad specialties at prices ranging up to $2 a ton over previously quoted prices.

Cleveland

The only thing certain in the Cleveland market at the start of this week was that the trend continues upward. With prices undergoing rapid change, this week's advance of 50c. per ton on No. 1 heavy melting is generally considered modest and if mill buying develops as expected, the quotation may easily prove on the low side. The New York Central steel is understood to have gone for $16.75 to a Cleveland broker, but on the resale the mill price was evidently not quite as high. Blast furnace grades are up 75c. per ton, based on a large recent sale into mill consumption.

Youngstown

Deliveries are very slow against recently placed mill orders, and are running below the present rate of mill consumption. Judging from the Erie Railroad steel, which is understood to have come to the Valley at a high figure, and considering dealer buying prices, which are very strong, No. 1 heavy melting could not be purchased under $17 here at the start of this week.

Buffalo

The market is a great deal stronger this week. A recent sale of No. 2 heavy melting steel was made at $13.50 to $14. Later, a smaller sale of No. 1 steel was made to a local mill at a price in the range of $15.50 to $16. Price advances have been general, affecting all grades. Supplies of No. 1 steel in the district are meager. Cast scrap has been very active in the past week.

St. Louis

Nearly every item on the list increased in price during the last week, the advances ranging from 25c. to $1 a ton. The reason for the advances is the effort of dealers to cover their short interests following the recent sale of 16,000 tons. So far the advances have brought little scrap to this market, as the country dealers are inclined to hold on to their stocks on account of the unsettled condition of the market.

Cincinnati

The scrap market is definitely bullish. Dealers' bids have all been increased $1, but material is reported to be worth whatever is obtained for it. Foundry grades are definitely active and dealers report a fair volume of trading for foundry grades, but they are reluctant to release steel material at present prices.

Detroit

Absence of mill buying in the Detroit area and the fact that dealers who have scrap are holding it very tight in the face of some shortages which remain to be covered have made the prices uncertain, but the situation is definitely bullish and small lot sales in the last few days indicate increases of 50c. to $1 a ton. The crux of the situation in Detroit is that a number of dealers are short and are anxious to cover their short orders even if it costs them a dollar or more to do it. Detroit bundle scrap closed Tuesday just before press time with offers from Pittsburgh up to $19.00.

Boston

The export market has recovered somewhat from the uncertainty first caused by declaration of war in Europe. During the past week a boat took a part load at Providence and left for New York, and another boat tied up at Providence to load. Local exporters are buying material at former prices and will load as soon as boats are available.

The British steamer Blairlogie, which left Portland, Me., on Aug. 25 with 7268 tons of scrap iron, was torpedoed on Sept. 10 off the coast of Ireland.

Domestic scrap prices have strengthened all along the line, and shipments are quite a bit more active than heretofore. Turnings for eastern Pennsylvania have advanced from $5.15 a ton on cars to $5.50. For Pittsburgh, turnings are $3.85 a ton on cars and not a market factor. Blast furnace material is up $1 to $1.10 a ton, with $3.25 a ton on cars the top for Massachusetts delivery. Dealers pay $8.60 to $8.70 a ton on cars for skeleton, Pittsburgh delivery, an extreme advance of 65c. a ton. Shafting is going to Pennsylvania at $16.50 a ton on cars, an advance of 35c. a ton. Washburn Wire Co., Phillipsdale, R. I., is now operating its three furnaces, and paying $15 to $15.25 a ton delivered for heavy melting steel. Textile and machinery cast is up 50c. a ton on the outside.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.00 to	$18.50
Railroad hvy. mltng...	20.00 to	20.50
No. 2 hvy. mltng. steel.	16.50 to	17.00
Scrap rails	20.00 to	20.50
Rails 3 ft. and under..	21.50 to	22.50
Comp. sheet steel	18.00 to	18.50
Hand bundled sheets..	17.00 to	17.50
Hvy. steel axle turn..	16.00 to	16.50
Machine shop turn....	11.50 to	12.00
Short shov. turn.....	14.00 to	14.50
Mixed bor. & turn....	10.00 to	10.50
Cast iron borings.....	10.00 to	10.50
Cast iron carwheels...	18.00 to	18.50
Hvy. breakable cast...	14.00 to	14.50
No. 1 cupola cast.....	18.00 to	18.50
RR. knuckles & cplrs.	21.00 to	21.50
Rail coil springs	22.00 to	22.50
Rail leaf springs	21.50 to	22.00
Rolled steel wheels....	21.50 to	22.00
Low phos. billet crops.	22.50 to	23.00
Low phos. punchings..	20.50 to	21.00
Low phos. plate (heavy)	20.50 to	21.50
Railroad malleable	18.00 to	18.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to	$17.50
No. 2 hvy. mltng. steel.	15.00 to	15.50
Hydraulic bund., new..	16.00 to	16.50
Hydraulic bund., old..	13.50 to	14.00
Steel rails for rolling.	18.00 to	18.50
Cast iron carwheels...	17.00 to	17.50
Hvy. breakable cast...	16.50 to	17.00
No. 1 cast	17.50 to	18.00
Stove plate (steel wks.)	14.00 to	14.50
Railroad malleable ...	16.50 to	17.00
Machine shop turn....	10.50 to	11.00
No. 1 blast furnace....	8.00 to	8.50
Cast borings	10.00 to	10.50
Heavy axle turnings..	12.00 to	12.50
No. 1 low phos. hvy...	19.50 to	20.00
Couplers & knuckles..	19.50 to	20.00
Rolled steel wheels ...	19.50 to	20.00
Steel axles	20.00 to	20.50
Shafting	22.00 to	22.50
Spec. iron & steel pipe	13.50 to	14.00
No. 1 forge fire	12.00 to	12.50
Cast boring (chem.)...	9.50 to	10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$14.50 to	$15.00
Auto. hvy. mltng. steel alloy free	13.50 to	14.00
No. 2 auto steel	12.00 to	12.50
Shoveling steel	14.50 to	15.00
Factory bundles	13.75 to	14.25
Dealers' bundles	12.75 to	13.25
Drop forge flashings...	11.00 to	11.50
No. 1 busheling	13.50 to	14.00
No. 2 busheling, old...	6.75 to	7.25
Rolled carwheels	15.50 to	16.00
Railroad tires, cut	16.00 to	16.50
Railroad leaf springs..	15.50 to	16.00
Steel coup. & knuckles	15.50 to	16.00
Axle turnings	13.50 to	14.00
Coil springs	17.50 to	18.00
Axle turn. (elec.)	14.50 to	15.00
Low phos. punchings..	16.50 to	17.00
Low phos. plates 12 in. and under	16.00 to	16.50
Cast iron borings	7.50 to	8.00
Short shov. turn.....	7.50 to	8.00
Machine shop turn....	7.50 to	8.00
Rerolling rails	19.00 to	19.50
Steel rails under 3 ft..	17.00 to	17.50
Steel rails under 2 ft..	17.50 to	18.00
Angle bars, steel	16.50 to	17.00
Cast iron carwheels ..	13.50 to	14.00
Railroad malleable	16.00 to	16.50
Agric. malleable	13.00 to	13.50
	Per Net Ton	
Iron car axles	$19.00 to	$19.50
Steel car axles	18.50 to	19.00
Locomotive tires	14.00 to	14.50
Pipes and flues	9.50 to	10.00
No. 1 machinery cast..	13.00 to	13.50
Clean auto. cast	13.50 to	14.00
No. 1 railroad cast....	12.00 to	12.50
No. 1 agric. cast	11.00 to	11.50
Stove plate	8.75 to	9.25
Grate bars	8.75 to	9.25
Brake shoes	10.50 to	11.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.50 to	$17.00
No. 2 hvy. mltng. steel.	15.75 to	16.25
Low phos. plate	18.00 to	18.50
No. 1 busheling	16.00 to	16.50
Hydraulic bundles	16.25 to	16.75
Machine shop turn....	9.00 to	9.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.75 to	$16.25
No. 2 hvy. mltng. steel.	14.75 to	15.25
Comp. sheet steel	15.50 to	16.00
Light bund. stampings	12.00 to	12.50
Drop forge flashings...	14.75 to	15.25
Machine shop turn....	8.50 to	9.00
Short shov. turn.	9.25 to	9.75
No. 1 busheling	14.50 to	15.00
Steel axle turnings....	11.00 to	11.50
Low phos. billet and bloom crops	19.75 to	20.25
Cast iron borings	9.50 to	10.00
Mixed bor. & turn.....	9.50 to	10.00
No. 2 busheling	9.50 to	10.00
No. 1 cupola cast	17.00 to	17.50
Railroad grate bars...	11.50 to	12.00
Stove plate	10.00 to	10.50
Rails under 3 ft.	19.25 to	19.75
Rails for rolling	19.00 to	19.50
Railroad malleable	17.00 to	17.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to	$16.00
No. 2 hvy. mltng. steel.	13.50 to	14.00
Scrap rails	18.00 to	18.50
New hvy. b'ndled sheets	13.50 to	14.00
Old hydraul. bundles..	12.00 to	12.50
Drop forge flashings...	13.50 to	14.00
No. 1 busheling	13.50 to	14.00
Machine shop turn....	9.00 to	9.50
Shov. turnings	10.00 to	10.50
Mixed bor. & turn....	8.50 to	9.00
Cast iron borings.....	8.50 to	9.00
Knuckles & couplers..	18.00 to	18.50
Coil & leaf springs.....	18.00 to	18.50
Rolled steel wheels....	18.00 to	18.50
No. 1 machinery cast..	16.50 to	17.00
No. 1 cupola cast.....	15.50 to	16.00
Stove plate	13.50 to	14.00
Steel rails under 3 ft...	19.00 to	19.50
Cast iron carwheels...	15.00 to	15.50
Railroad malleable ...	16.50 to	17.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting..	$13.00 to	$13.50
No. 1 hvy. melting....	12.50 to	13.00
No. 2 hvy. melting....	12.00 to	12.50
No. 1 locomotive tires.	13.25 to	13.75
Misc. stand. sec. rails.	15.00 to	15.50
Railroad springs	16.00 to	16.50
Bundled sheets	8.50 to	9.00
No. 1 busheling	8.00 to	8.50
Cast. bor. & turn.....	3.50 to	4.00
Machine shop turn....	4.50 to	5.00
Heavy turnings	9.50 to	10.00
Rails for rolling	17.00 to	17.50
Steel car axles	18.50 to	19.00
No. 1 RR. wrought.....	10.00 to	10.50
No. 2 RR. wrought....	12.50 to	13.00
Steel rails under 3 ft..	16.00 to	16.50
Steel angle bars	14.00 to	14.50
Cast iron carwheels...	15.00 to	15.50
No. 1 machinery cast..	15.00 to	15.50
Railroad malleable	14.00 to	14.50
No. 1 railroad cast....	12.50 to	13.00
Stove plate	8.50 to	9.00
Grate bars	8.50 to	9.00
Brake shoes	9.50 to	10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$12.50 to	$13.00
No. 2 hvy. mltng. steel.	10.25 to	10.75
Scrap rails for mltng.	16.00 to	16.50
Loose sheet clippings.	8.00 to	8.50
Hydrau. b'ndled sheets	12.00 to	12.50
Cast iron borings	4.50 to	5.00
Machine shop turn....	5.75 to	6.25
No. 1 busheling	8.50 to	9.00
No. 2 busheling	3.50 to	4.00
Rails for rolling	18.00 to	18.50
No. 1 locomotive tires.	14.50 to	15.00
Short rails	18.75 to	19.25
Cast iron carwheels...	13.75 to	14.25
No. 1 machinery cast..	13.75 to	14.25
No. 1 railroad cast....	13.50 to	14.00
Burnt cast	7.75 to	8.25
Stove plate	7.75 to	8.25
Agricul. malleable	12.00 to	12.50
Railroad malleable	14.50 to	15.00
Mixed hvy. cast	12.25 to	12.75

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.....	....	$13.00
Scrap steel rails	$13.50 to	14.00
Short shov. turnings...	....	7.50
Stove plate	....	9.50
Steel axles	....	18.50
Iron axles	....	18.50
No. 1 RR. wrought....	....	10.00
Rails for rolling	16.00 to	16.50
No. 1 cast	....	15.00
Tramcar wheels	14.50 to	15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$11.50 to	$12.00
No. 2 hvy. mltng. steel.	10.50 to	11.00
Borings and turnings..	6.50 to	7.00
Long turnings	5.75 to	6.75
Short shov. turnings...	7.25 to	7.75
No. 1 machinery cast..	13.50 to	14.00
Automotive cast.	14.00 to	14.50
Hvy. breakable cast...	10.00 to	10.50
Stove plate	8.50 to	9.00
Hydraul. comp. sheets.	14.00 to	14.50
New factory bushel....	12.00 to	12.50
Sheet clippings	9.00 to	10.00
Flashings	11.50 to	12.00
Low phos. plate scrap.	13.00 to	13.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$12.50 to	$13.00
No. 2 hvy. mltng. steel.	10.00 to	10.50
Hvy. breakable cast...	13.00 to	13.50
No. 1 machinery cast..	13.00 to	13.50
No. 2 cast	11.00 to	11.50
Stove plate	10.50 to	11.00
Steel car axles	15.00 to	15.50
Shafting	15.00 to	15.50
No. 1 RR. wrought....	11.00 to	11.50
No. 1 wrought long....	9.50 to	10.00
Spec. iron & steel pipe	9.00 to	9.50
Rails for rolling	16.00 to	16.50
Clean steel turnings*..	4.50 to	5.00
Cast borings*	3.50 to	4.00
No. 1 blast furnace....	3.50 to	4.00
Cast borings (chem.)..	9.50 to	10.00
Unprepared yard scrap	6.00 to	6.50
Light iron	3.00 to	3.50
Per gross ton, delivered local foundries:		
No. 1 machn. cast†....	$16.00 to	$16.50
No. 2 cast†	12.00 to	12.50

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$10.50 to	$10.75
Machine shop turn	3.88 to	5.50
Mixed bor. & turn....	3.15 to	3.25
Bun. skeleton long	8.60 to	8.70
Shafting	....	16.50
Cast bor. chemical.....	5.00 to	6.00
Per gross ton delivered consumers' yards:		
Textile cast	$14.00 to	$15.00
No. 1 machine cast...	14.00 to	15.00
Per gross ton delivered dealers' yards:		
No. 1 hvy. mltng. steel.	$12.25 to	$12.75
No. 2 steel	10.75 to	11.25

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.....	$14.35
No. 2 hvy. mltng. steel.....	13.35

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.25	$8.75
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	6.75	6.25
Drop forge flashings...	8.25	7.75
New loose clippings...	4.25	3.75
Busheling	3.75	3.25
Scrap pipe	4.25	3.75
Steel turnings	4.25	3.75
Cast borings	3.75	3.25
Machinery cast	14.00	13.50
Dealers cast	12.00	11.50
Stove plate	8.00	7.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges		
No. 1 hvy. mltng. steel.	$13.50 to	$14.00
No. 2 hvy. mltng. steel.	12.00 to	12.50
No. 2 cast	11.50 to	12.00
Stove plate	10.50 to	11.00
Boston on cars at Army Base or Mystic Wharf		
No. 1 hvy. mltng. steel.	$14.00 to	$14.25
No. 2 hvy. mltng. steel.	13.00 to	13.25
Rails (scrap)	14.00 to	14.25
Philadelphia, delivered alongside boats, Port Richmond.		
No. 1 hvy. mltng. steel.	$15.75 to	$16.00
No. 2 hvy. mltng. steel.	14.50 to	14.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.00c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c.
Detroit, delivered	2.00c.
On cars dock Tex. Gulf ports	2.25c.
On cars dock Pacific ports	2.35c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.80c.
Detroit, delivered	1.90c.
On cars dock Tex. Gulf ports	2.15c.
On cars dock Pacific ports	2.25c.

IRON BARS

Chicago and Terra Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.*
Philadelphia, del'd	2.05c. to 2.15c.
New York, del'd	2.19c. to 2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

* Subject to concessions, particularly in the East, of $2 a ton.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.00c.
Detroit, delivered	2.10c.
Philadelphia, delivered	2.17c.
Granite City	2.10c.
On cars dock Pacific ports	2.50c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from $4 to $8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.) 8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.00c.
Detroit, delivered	2.10c.

Cooperage Stock

Pittsburgh & Chicago	2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from $4 to $8 a ton were prevalent Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

COLD ROLLED STRIP*

	Base per Lb
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to $4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.40
Coated nails	2.40
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	3.10
Galvanized staples	3.35
Twisted barbless wire	3.25
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool...	$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	$2.76

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	+9	+30
¼ to ⅜	59	43½	½	24	6½
½	63½	54	¾	30	13
¾	66½	60½	1 & 1¼	34	19
1 to 2	68½	60½	1½	38	21½
			2	37½	21

Lap Weld

2	61	52½	2	30½	15
2½ & 3	64	55½	2½ to 3½	31½	17½
3½ to 6	66	57½	4	33½	21
7 & 8	65	55½	4½ to 8	32½	20
9 & 10	64½	55	9 to 12	28½	15
11 & 12	63½	54			

Butt weld, extra strong, plain ends

⅛	54½	41½	¼ & ⅜	+10	+43
½ to ⅜	56½	45½	½	25	9
½	61½	37½	¾	31	15
¾	65½	57½	1 to 2	38	22½
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	33½	18½
2½ & 3	63	55½	2½ to 4	39½	25½
3½ to 6	66½	59	4½ to 6	37½	24
7 & 8	65½	56	7 & 8	38½	24½
9 & 10	64½	55	9 to 12	32	20½
11 & 12	63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
1 in. o.d.....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2½ in. o.d...12 B.W.G.	18.45	16.01	15.16
2¾ in. o.d...12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d.....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d.....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d..... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d..... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham..	43.00
6-in. and larger, f.o.b. deck, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle.....	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle.....	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $5 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. and 6 in. and smaller....	68½
Larger and longer up to 1 in..	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive.....	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger.....	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate .....72½ and	12½
Stove bolts in bulk.....	84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham ...65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller....50 and	10
Milled headless set screws, cut thread ¾ in. and smaller.....	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	75
Upset set screws, cup and oval points	77½
Milled studs	60

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base.....	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel).....	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel....	0.15
6100 Chromium-vanadium bar...	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip ...	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s.
Steel bars, open hearth..	£10 8s.
Beams, open hearth....	£10
Channels, open hearth..	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G...	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up.....	£5 7s.
Plate 3/16 in. and 5 mm...	£5 13s.
Sheet ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base....	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro Swedeland and Steelton, Pa., and Sparrows Points, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base

Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore*

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c
Iron, basic or foundry, Swedish, aver. 65% iron	10½c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48%	27c

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$18.00
Tungsten, domestic, scheelite delivered	$16.00 to $17.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.00
Turkish, 48-49%	22.50
Turkish, 45-56%	19.50
Turkish, 40-11%	17.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	22.50

*All foreign ore prices are nominal.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $19.00
Domestic, f.o.b. Ohio River landing barges	$17.50 to $19.50
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.	$19.00 to $20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	$22.50 to $23.50
Domestic No. 1 ground bulk, 98 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$32.50 to $33.50

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J.	4.00c.
No. 6, f.o.b. Bayonne, N. J.	2.50c.
No. 5 Bur. Stds., del'd Chicago	3.25c
No. 6 Bur. Stds., del'd Chicago	2.75c
No. 3 distillate, del'd Cleve'd.	5.375c.
No. 4 industrial, del'd Cleve'd.	5.125c.
No. 5 industrial, del'd Cleve'd.	3.75c
No. 6 industrial, del'd Cleve'd.	3.50c

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by - product Chicago ovens	10.25
Foundry, by - product, del'd New England	12.50
Foundry, by - product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product, Philadelphia	10.95
Foundry, by - product delivered Cleveland	10.30
Foundry, by - product delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

The Week's Market News

(CONTINUED FROM PAGE 109)

Heavy domestic buying and brisk export inquiry have featured this market at CLEVELAND and YOUNGSTOWN. Inquiries as high as 25,000 tons each have been reported. Rounds for munitions particularly are in good demand for export. Delivery promises vary, depending on size and grade, but in general range around two to three weeks. Bar mill capacity in both districts is large, which will help assure good deliveries.

Carbon and alloy bars are two of the most active products in the CHICAGO district.

WAREHOUSE BUSINESS

. . . Orders gain but not as rapidly as in other items

WIRE sales at PITTSBURGH have picked up substantially in the past few days as the result of the general advance in steel demand over the past week. Orders for wire are somewhat ahead of a month ago and many companies are taking only those specifications that can be shipped out by the end of this month. Some wire business is being taken subject to the price in effect at the time of shipment. In the case of merchant wire products sales have become quickened and customers are sending in rush orders, but the volume being booked is being held down as far as possible. Mills are not filling up order books feeling that increased costs may force higher prices.

As in other lines, export and domestic demand for rods, merchants' and manufacturers' wire has spurted at CLEVELAND since Sept. 5.

TIN PLATE

. . . Operations bulge to 68% . . . Prices extended "until further notice"

TIN plate production this week is estimated at 68 per cent of capacity compared with 61 per cent last week and 66 per cent the week before. Further advance in activity is anticipated. With tin plate inventories at can makers' plants at a relatively low point and with foreign business sure to increase substantially, a swell in new tin plate business is expected in the very near future. There are many inquiries from foreign countries whose source of supplies has been cut off by the war.

"Until further notice" tin plate makers will take business at current prices for fourth quarter shipment. This is interpreted generally as putting tin plate prices on a spot basis subject to change as conditions warrant.

SHIPBUILDING

. . . Maritime Commission asks bids on 20 boats . . . To recondition 113 . . . 10 boats awarded

APPROXIMATELY 160,000 tons of steel, of which about 120,000 will be plates and the remainder shapes and bars, will be required for 33 cargo ships of 525,000 tons displacement for which the Maritime Commission is asking bids. Tenders will be opened on Sept. 19 for 20 C-2 type vessels. On Sept. 20 bids will be opened for 10 type C-3 and three type C-2 ships. Type C-2 ships will each have 13,900 tons displacement. Type C-3 ships will each have 17,600 tons displacement. Of the C-2 ships, for which bids will be opened on Sept. 19, eight will have direct diesel propulsion, four gear-drive propulsion and eight turbine propulsion. Both type C-3 and C-2 ships for which bids will be opened Sept. 20, will have turbine propulsion. All the ships are to be built to Navy-approved specifications. The commission program calls for 50 ships a year for 10 years.

The commission also has prepared, on short notice, to begin reconditioning of 113 of its laid-up vessels.

The Maritime Commission has awarded a contract for 10 ships to cost $19,400,000 to the Bethlehem Steel Co.

PLATES

. . . Domestic orders heavier . . . Export prices higher

HEAVIER requirements are coming out from domestic plate buyers. At CLEVELAND it is said export demand has not yet become sensational but prices have risen swiftly and at the start of this week were equivalent to a $3 per ton premium over the domestic level. All export quotations are f.a.s.

Demand for plates in the CHICAGO district has been active in the past week in anticipation of higher prices and lengthening deliveries. The North Western railroad has received estimates from car builders on its program of 800 cars but as yet has made no awards. Car shortages already have been reported by some Western railroads as a result of a greater volume of traffic over the past few weeks. If carloadings continue to increase, new equipment will be absolutely necessary.

There was a heavy demand for all types of plates in eastern Pennsylvania in the past week, with practically every district consumer, including the shipbuilders, endeavoring to assure themselves of supplies for the near future. Quotations on this business were at the full market price. A few small lots for Scandinavian countries were also booked at 2.10c., f.a.s., Philadelphia, but mills are now asking 2.10c., f.o.b. mill, with freight allowed to the seaboard

Plate demand has picked up in the NEW YORK area, but has by no means assumed boom proportions. Prices are much firmer.

IRON ORE

. . . Lake Superior movement increasing . . . Foreign trading at standstill

AT the Lake Superior ore ranges and all along the line activity has been stepped up noticeably in the past two weeks, spurred by Canadian and domestic anticipation. Around 30 vessels have been added or are being fitted out to join the American Great Lakes ore fleet, which on Aug. 15 totaled 206 vessels. Once more estimates of the total seasonal movement are being revised and some now predict shipments will be as high as 43,000,000 tons. As usual, considerable depends on whether major interests end their season Nov. 1 or Nov 15.

RAILROAD BUYING

. . . Louisville & Nashville orders 30,000 tons of rails

SUPPLEMENTARY rail buying of substantial proportions has been placed. The Louisville & Nashville has ordered 30,000 tons, the Seaboard Air Line, 5000 tons and the Illinois Central, 2000 tons from the Tennessee Coal, Iron & Railroad Co. The Rock Island has ordered 7000 tons of rails from Colorado Fuel & Iron Corp. and 5000 tons from Inland Steel Co. The Tennessee company has relighted another open hearth furnace and is restarting its Ensley rail mill, which has been shut down for some weeks. The Seaboard also ordered 315,000 tie plates.

It is understood that the 75,000 tons of rails which have been pending for Brazilian railroad interests are coming close to the firm contract stage, decisions having been expedited by European events in the past week.

The Erie Railroad is inquiring for 1000 freight cars as follows: 500 box cars, 200 hopper cars, 50 flat cars and 250 gondolas. The Erie is also reported to be considering the purchase of seven or eight diesel electric locomotives.

FABRICATED STEEL

. . . Lettings advance to 19,100 tons from 9250 tons last week . . . New projects higher at 14,800 tons as against 6550 tons a week ago . . . Plate awards call for 3145 tons.

ATLANTIC STATES
AWARDS

2400 Tons, Brooklyn, Midwood High School, to Harris Structural Steel Co., Plainfield, N. J.

1600 Tons, Brooklyn, crane runway extension Brooklyn Navy Yard, to American Bridge Co., Pittsburgh.

1010 Tons, Washington, Potomac Electric Power Co., Buzzard's Point station, to American Bridge Co., Pittsburgh.

1000 Tons, Queens, N. Y., Shore Parkway, contract MS-39-15, to American Bridge Co., Pittsburgh.

725 Tons, Wawarsing, N. Y., contract No. 340, Lackawack Dam, to Bethlehem Steel Co., Bethlehem, Pa.

550 Tons, New York, turbine and boiler foundations for Consolidated Edison Co., to American Bridge Co., Pittsburgh.

460 Tons, Allegany County, N. Y., State highway bridge FAGH 8529, to Bethlehem Steel Co., Bethlehem, Pa.

265 Tons, New York, curbs, East River Drive, 64th-81st Streets, contract 12C, to Phoenix Bridge Co., Phoenixville, Pa.

250 Tons, Tonawanda, N. Y., experimental assembly building, Curtis Wright Corp., to R. G. Mahon Co., Detroit.

225 Tons, Hyde Park, N. Y., Roosevelt Memorial Library, to Bethlehem Steel Co., Bethlehem, Pa., through John McShain, Inc., Philadelphia.

220 Tons, Bedford County, Pa., bridge section, to American Bridge Co., Pittsburgh.

150 Tons, Brooklyn, Shore Parkway, contract MS-39-5, to American Bridge Co., Pittsburgh.

145 Tons, Green Haven, N. Y., cell blocks, to Belmont Iron Works, Philadelphia.

110 Tons, New York, stores and apartments, 1307 Sixth Avenue, to Grand Iron Works, New York.

105 Tons, Woodlawn, New York, crane runway, Federal Portland Cement Co., to Lackawanna Steel Construction Co., Buffalo.

100 Tons, Philadelphia, garage for Quaker City Grocery Co., to Bethlehem Steel Co., Bethlehem, Pa.

SOUTH AND SOUTHWEST

285 Tons, State of Mississippi, bridge, FAP-45 (3), to Virginia Bridge Co., Roanoke, Va.

120 Tons, Canyon Diable, Ariz., State bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

CENTRAL STATES

1935 Tons, New Castle, Ind., transmission towers, Public Service Co. of Indiana, to American Bridge Co., Pittsburgh.

1915 Tons, Chicago, State Street subway, contract S3, to American Bridge Co., Pittsburgh.

1855 Tons, Chicago, Dearborn Street subway, contract D1, to American Bridge Co., Pittsburgh.

650 Tons, Youngstown, Marshall Street bridge superstructure, to Bethlehem Steel Co., Bethlehem, Pa., on low bid of $125,817.

595 Tons, La Crosse, Wis., Public Utilities Engineering & Service steam plant, to Milwaukee Bridge Co., Milwaukee.

460 Tons, Harvard, Ill., bridge section, to American Bridge Co., Pittsburgh.

380 Tons, Ellis County, Kan., bridges, to St. Joseph Structural Steel Co., St. Joseph, Mo.

260 Tons, St. Mary's, Ohio, Goodyear Tire & Rubber plant, to Burger Iron Co., Akron, Ohio.

260 Tons, Wisconsin Rapids, Wis., Consolidated Water, Power & Paper plant addition, to Wisconsin Bridge & Iron Co., Milwaukee.

200 Tons, River Forest, Ill., apartment building for River Forest Garden Apartment Corp., to unnamed bidder.

185 Tons, Newton County, bridge, to Kansas City Structural Steel Co., Kansas City, Kan.

160 Tons, Chicago, Brownell School, to A. F. Anderson Iron Works Co., Chicago.

120 Tons, Grant County, Wis., bridge, to Theodore Kupfer Foundry & Iron Works, Madison, Wis.

115 Tons, Fife Lake, Mich., State bridge, to R. C. Mahon Co., Detroit.

100 Tons, Hobart, Ind., bridge, to American Bridge Co., Pittsburgh.

WESTERN STATES

169 Tons, Ventura, Cal., bridge, to Pacific Iron & Steel Co., Los Angeles; through Macco Construction Co., Clear Water, Cal.

PENDING STRUCTURAL PROJECTS
NORTH ATLANTIC STATES

1600 Tons, New York, building for Tiffany & Co.

1300 Tons, Stamford, Conn., buiding for Northam-Warren.

900 Tons, Glassport, Pa., mill building for Copperweld Steel Co.

700 Tons, Cattaraugus County, State highway bridge; bids cose Sept. 20.

700 Tons, Quincy, Mass., process building for Procter & Gamble Co.

600 Tons, McKeesport, Pa., office and warehouse for Potter-McCune Co.

500 Tons, Jackson Heights, N. Y., apartment building.

230 Tons, Delaware County, State highway bridge; bids close Sept. 20.

125 Tons, Massena, N. Y., building No. 120 for Aluminum Co. of America.

THE SOUTH

1700 Tons, Louisville, Ky., railroad bridge.

CENTRAL STATES

250 Tons, Cleveland, plant addition for Cleveland Pneumatic Tool Co.

200 Tons, Cuyahoga-Geauga Counties, Ohio, Chagrin River bridge.

180 Tons, Gates Mills, Ohio, State bridge; bids Sept. 16, also 60 tons of reinforcing bars.

WESTERN STATES

2500 Tons, Alameda, Cal., two seaplane hangars; bids Sept. 27.

1500 Tons, Woodland, Wash., Lewis River bridge; bids Sept. 26.

600 Tons, San Francisco, brewery.

433 Tons, Wray, Colo., State bridge; bids in.

270 Tons, Stockton, Cal., new Jacobs No. 1 bridge.

260 Tons, Wamsutter, Wyo., bridge; bids Sept. 19.

243 Tons, Yuma County, Colo., Arickaree River bridge on State highway 51; bids Sept. 14.

FABRICATED PLATES
AWARDS

1400 Tons, Enumclaw, Wash., Stevens Dam (Mud Mountain Dam), to Western Pipe & Steel Co., San Francisco; through Guy F. Atkinson, San Francisco, contractor.

1240 Tons, Quincy, Mass., tanks and towers for Procter & Gamble Co., to Hammond Iron Works, Warren, Pa.

370 Tons, Elizabeth, N. J., six oil tanks, New York Oil Storage & Transfer Co., to Graver Tank & Mfg. Co., East Chicago, Ind.

135 Tons, Queens, N. Y., pipe, Shore Parkway, contract MS-39-15, to Alco Products Co., Dunkirk, N. Y.

SHEET PILING
AWARDS

18,000 Tons, for Tennessee Valley Authority, to Inland Steel Co., Chicago.

600 Tons, Erie, Pa., bulkhead for Peninsular State Park, to Bethlehem Steel Co., Bethlehem, Pa., through L. A. Wells Construction Co.

REINFORCING STEEL

. . . Awards of 3200 tons; 3575 tons in new projects.

ATLANTIC STATES
AWARDS

1040 Tons, Franklin Falls, N. H., dam, to Truscon Steel Co., Youngstown, Ohio; Coleman Bros. Corp., Boston, contractors.

550 Tons, Somerset County, Pa., highway project, to Bethlehem Steel Co., Bethlehem, Pa., through Union Paving Co., Philadelphia.

315 Tons, Wilkes-Barre, Pa., pumping station, to Bethlehem Steel Co., Bethlehem, Pa., through B. G. Coon, Philadelphia.

300 Tons, Queens, N. Y., Long Island Railroad grade elimination, Aqueduct Station, to Bethlehem Steel Co.; Wilson & English, contractors.

200 Tons, Brockport, N. Y., school and gym, to Buffalo Steel Co., Buffalo, Grosline & Swan, contractors.

200 Tons, Somerset County, Pa., highway project, to Carnegie-Illinois Steel Corp., Pittsburgh, through Union Paving Co., Philadelphia.

CENTRAL STATES

1000 Tons, Grand Rapids, Mich., reservoir, to Calumet Steel Co., Chicago.

500 Tons, Chicago, housing project, 87th Street and Cottage Grove, to Calumet Steel Co., Regon Construction Co., contractor.

100 Tons, Bay City, Mich., telephone exchange building, to Truscon Steel Co., Spence Brothers, contractors.

100 Tons, Chicago, traffic fin, Lincoln Park, to Calumet Steel Co., Chicago.

PENDING REINFORCING BAR PROJECTS
ATLANTIC STATES

538 Tons, Panama Canal, Schedule No. 3589; bids Sept. 15.

400 Tons, Rutherford, N. J., sewage treatment plant; F. H. McGraw, low bidder.

265 Tons, Saltzburg, Pa., Loyalhanna Dam, Great Lakes Dredge & Dock Co., low bidder.

SOUTH AND CENTRAL

1000 Tons, Louisville, Ky., Pennsylvania R. R. grade elimination; bids Sept. 18.

859 Tons, Chicago, section S4-B, subway; new bids Sept. 21.

150 Tons, Cleveland, East Ninth Street underpass.

WESTERN STATES

1575 Tons, Alameda, Cal., Navy power plant and store house; K. E. Parker Co., San Francisco, general contractor (revised tonnage, project previously reported).

155 Tons, Deer Creek, Utah, Provo River project (Invitation 27624-A); bids in.

131 Tons, Bowie, Ariz., highway work; bids Sept. 15.

113 Tons, Stockton, Cal., Fibreboard Products Co. plant; bids in.

103 Tons, Bramwell, Idaho, Boise project (Invitation 21155-A); bids in.

Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 4000 tons of chrome ore from the Philippine Islands; 233 tons of pig iron from British India; 53 tons of steel tubes and 19 tons of steel bars from Sweden; 101 tons of steel bars, 70 tons of structural shapes and 92 tons of steel bands from Belgium; 5 tons of structural shapes and 18 tons of steel bands from France.

. . . NON-FERROUS . . .

. . . Bookings continue fairly heavy, but restrictions imposed by sellers return semblance of order to markets . . . Zinc and lead prices raised $5 a ton . . . Consumer's lead requirements for both September and October estimated to be covered.

NEW YORK, Sept. 12—Demand for all non-ferrous metals continued in fairly heavy volume in the past week, but restrictions on sales imposed by sellers tended to establish more orderly markets. Sellers were still somewhat confused by the sudden rush to buy as the war in Europe is not likely to influence supplies here as long as this country remains neutral. An official of St. Joseph Lead Co., in an effort to dispel the doubt as to the sufficiency of supplies for domestic consumers, publicly stated that there was no cause for fears of a shortage of lead. Trading in London has been suspended by the Government pending the settling of an official price, which for copper is expected to be in the neighborhood of £52 per ton, delivered consumers' plants. A good bit of domestic copper demand went unsatisfied last week due to the caution exercised by sellers. Producers' quotations are unchanged at 12c. per lb., but a limited business was done in the open market at as high as 12.625c. per lb., Valley delivery. The Japanese acquired some metal earlier in the week at around 12.40c. per lb., f.a.s.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Sept. 6	Sept. 7	Sept. 8	Sept. 9	Sept. 11	Sept. 12
*Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
*Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York	61.00	65.00	70.00	....	75.00	75.00
Zinc, East St. Louis[2]	5.75	5.75	5.75	5.75	6.25	6.25
Lead, St. Louis[3]	5.10	5.35	5.35	5.35	5.35	5.35

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery. *Quotations for Sept. 5 revised to 12c.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	Nominal	Nominal
Copper, Lake	13.25c.	13.125c.
Copper, electro	13.00c.	13.00c.
Copper, castings	12.625c.	12.625c.
*Copper sheets, hot-rolled	20.12c.	20.12c.
*High brass sheets	18.90c.	18.96c.
*Seamless brass tubes	21.06c.	21.06c.
*Seamless copper tubes	20.62c.	20.62c.
*Brass rods	13.63c.	13.63c.
Zinc slabs	7.25c.	8.00c.
Zinc sheets, No. 9 casks	10.75c.	12.10c.
Lead, American pig	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	Nominal	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.875c.	10.50c.
Copper, hvy. and wire	8.875c.	9.25c.
Copper, light and bottoms	8.00c.	8.50c.
Brass, heavy	5.00c.	5.50c.
Brass, light	4.125c.	4.875c.
Hvy. machine composition	8.00c.	8.875c.
No. 1 yel. brass turnings	4.75c.	5.25c.
No. 1 red brass or compos. turnings	7.875c.	8.375c.
Lead, heavy	4.375c.	4.75c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	13.50c.	15.00c.
Zinc	2.625c.	3.875c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 12.25c. a lb. QUICKSILVER, $135 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.75c. a lb.

Zinc

Prime Western sales in the past week amounted to 22,761 tons, despite the reticence displayed by practically every selling interest. Some sellers were completely out of the market for part of the week, while others adopted the policy of limiting bookings to established customers on the basis of past purchases. On Monday of this week prices were raised $5 a ton to a basis of 6.64c. per lb., New York, the highest level reached since Oct. 5, 1937. It is reported that some producers have entirely disposed of their fourth quarter output.

Lead

Heavy buying of lead continued last week, but in a more orderly fashion. The week's total was estimated to be somewhat above the preceding week and, in the case of one interest, was the largest on record. On the basis of August consumption, domestic users are now fairly completely covered for both September and October. Quotations were raised $5 a ton on Sept. 7 to 5.50c. per lb., New York, and have remained unchanged since.

August Average Prices

The average prices of the major non-ferrous metals in August, based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	10.49c.
Lake copper, Eastern delivery	10.49c.
Straits tin, spot, New York	48.80c.
Zinc, East St. Louis	4.72c.
Zinc, New York	5.11c.
Lead, St. Louis	4.89c.
Lead, New York	5.04c.

Tin

The scramble for nearby supplies continued throughout the past week, but with spot metal practically nonexistent and the question of importing material shrouded in such uncertainties, the bulk of the demand went unfilled. With such chaotic conditions prevailing, all quotations are nominal, but an appraisal of the market would indicate that such nearby material as is available today costs in the neighborhood of 75c. per lb., for Straits grade, New York, as compared with 59c. a week ago and 49c. two weeks ago, a gain of 26c. per lb. in about 15 days.

August Iron Output Up 12.9% to 2,659,813 Tons

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1939	1938	1939	1938
January	2,175,423	1,429,085	20,805	22,388
February	2,060,187	1,298,268	18,655	20,205
March	2,394,615	1,452,487	16,008	21,194
April	2,056,177	1,376,141	11,518	18,697
May	1,717,516	1,255,024	7,888	13,341
June	2,118,451	1,062,021	16,617	14,546
½ year	12,522,369	7,873,026	91,491	110,281
July	2,356,270	1,201,785	21,213	20,818
August	2,659,813	1,493,995	20,628	6,088
September	.....	1,680,435	....	630
October	.....	2,052,284	....	3,621
November	.....	2,269,983	....	13,156
December	.....	2,210,728	....	19,197
Year	.....	18,782,236	....	173,791

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

Gross Tons

	1939	1938	1937	1936	1935
January	70,175	46,100	103,597	65,351	47,656
February	73,578	46,367	107,115	62,886	57,448
March	77,246	46,854	111,596	65,816	57,098
April	68,539	45,871	113,055	80,125	55,449
May	55,404	40,485	114,104	85,432	55,713
June	70,615	35,400	103,584	86,208	51,570
½ year	69,184	43,497	108,876	74,331	54,138
July	76,009	38,767	112,866	83,686	49,041
August	85,800	48,193	116,317	87,475	56,816
September	....	56,015	113,679	91,010	59,216
October	....	66,203	93,311	96,512	63,820
November	....	75,666	66,891	98,246	68,864
December	....	71,314	48,075	100,485	67,950
Year	....	51,458	100,305	83,658	67,556

Merchant Iron Made, Daily Rate

Tons

	1939	1938	1937	1936	1935
January	10,603	10,635	16,106	10,537	3,926
February	9,637	8,854	16,514	11,296	6,288
March	8,951	8,524	16,457	10,831	7,089
April	8,508	8,273	14,517	13,897	8,799
May	7,038	6,431	19,483	12,814	8,441
June	7,613	5,375	15,870	14,209	7,874
July	8,396	5,495	19,609	11,619	8,644
August	....	6,614	17,831	12,148	8,194
September	....	11,205	20,065	12,526	10,090
October	....	10,799	18,950	13,645	11,199
November	....	13,208	15,662	14,739	12,503
December	....	9,130	10,964	14,852	13,312

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons) August (31 Days)	Production (Gross Tons) July (31 Days)	September 1 Number in Blast	September 1 Operating Rate, Tons a Day	August 1 Number in Blast	August 1 Operating Rate, Tons a Day
New York:						
Buffalo	190,669	154,834	9	6,150	9	5,520
Other New York and Mass.	15,771	14,711	1	510	1	475
Pennsylvania:						
Lehigh Valley	56,051	48,767	4	1,810	*4	*1,575
Spiegeleisen	4,115	4,525	1	135	1	145
Schuylkill Valley	25,468	21,773	2	820	2	700
Susquehanna and Lebanon Valleys	12,979	14,003	1	420	1	450
Pittsburgh District	541,045	434,922	26	18,780	21	14,435
Ferro. and Spiegel	5,259	16,649	1	170	2	535
Shenango Valley	14,738	11,511	1	475	1	445
Western Pennsylvania	58,170	49,969	4	2,005	3	1,610
Ferro. and Spiegel	8,853	6,590	1	285	1	215
Maryland	164,985	173,093	6	5,320	6	5,585
Wheeling District	132,746	127,639	6	4,280	6	4,115
Ohio:						
Mahoning Valley	289,128	261,865	13	9,135	12	8,510
Central and Northern	277,437	188,293	14	8,950	14	8,500
Southern	36,570	43,348	4	1,180	4	1,095
Illinois and Indiana	486,759	428,291	19	15,800	17	14,140
Michigan and Minnesota	65,630	75,054	5	2,810	4	2,420
Colorado, Missouri and Utah	44,103	41,742	3	1,425	3	1,440
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	2,754	2,775	1	90	1	90
Kentucky	25,586	24,854	2	825	2	800
Alabama	194,606	204,691	13	6,135	14	6,755
Ferro. and Spiegel	6,381	6,441	1	205	1	210
Tennessee	.....	.....	0	....	0	....
Total	2,659,813	2,356,270	138	87,715	130	79,765

*Revised, reported out last month in error.

. . . OBITUARY . . .

MAX LURIA, treasurer of Luria Brothers & Co., Philadelphia, died at his home in Ventnor, Pa., on Sept. 9, aged 67 years. A native of Lithuania, Mr. Luria came to this country as a young man and with two brothers laid the foundations of one of the largest scrap iron firms in the country by starting a small scrap iron business in Reading, Pa., in 1895. Mr. Luria was a leader in Jewish community activity in Reading for many years.

Steel Corp. Shipments Jump to 803,822 Tons

SUBSIDIARY companies of United States Steel Corp., shipped 803,822 tons of finished steel products in August, an increase of 127,513 tons over July and a gain of 245,188 tons above August, 1938. For 1939 to date, shipments were 5,873,397 tons, compared with 4,010,558 tons in the comparable period of last year, an increase of 1,862,839 tons.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 Per Cent of Capacity	1939 Shipments	1939 *Per Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789.305	51.8
February	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5	677.994	49.3
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	767,910	50 4
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	701.459	47.5
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	723,165	47.4
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	733,433	49.7
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	676.309	44.5
August	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3	803,822	52.7
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	.....	...
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	.....	...
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	.....	...
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	...
Minus yearly adjustment	(—23,750)	...	(—40.859)	...	(—77,113)	..	(+30,381)	...	.....	
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	6,655,749	36.7	.....	...

*Annual finished steel capacity 17,940,600 gross tons, with monthly percentages based on actual number of weeks in each month.

Machine Tool Developments Proceed Apace

(CONTINUED FROM PAGE 77)

machine proper. Eighteen feed changes in geometric progression are available. Rapid traverse is provided in both directions for movements of the table, saddle and knee. There are also hand adjustments for all these motions. Feeds for saddle and knee are controlled by directional ball handle levers, as is the table movement.

On the No. 26 machine the table measures 50 x 12 in.; on the No. 36 machine, 58 x 13 in. The table feed screw is supported in ball bearings at both ends and has six splines to divide the torsional load of the feed.

Miller With Vertical Head Feed

THE combination of a horizontal spindle with an automatic hydraulic vertical head feed is the principal feature of the No. 1-V milling machine made by *Kent-Owens Machine Co.*, Toledo. The table, 9 x 25 in., is not power driven, but can be adjusted lengthwise by screw and micrometer dial. Cross adjustment of 2½ in. is also obtainable by means of a quill and micrometer dial. The use of vertical power feed is especially suited for milling long and bulky pieces held in a fixed position on the table, such as in sinking Woodruff keyways.

The head movement is actuated hydraulically by a separately driven pump. Any feed from 1 to 80 in. per min. can be obtained in a downward direction, and rapid traverse is provided both up and down. On the rear of the machine are adjustable dogs for setting the cycle. The head assembly is mounted on two ground cylindrical steel posts, with the feed cylinder above them. The spindle is driven by a standard ball bearing motor, and there are only two gear contacts between motor and cutter, pick-off gears giving speeds from 100 to 2000 r.p.m.

Combination Band Sawing and Filing Machine

GROB BROTHERS of Grafton Wis., have developed a combination machine for band sawing or chain filing, designated as model NS-24 and having a throat of 24 in. The pulleys have inlaid rubber bands for the saw track and alongside is a separate groove for the file chain. Changeover from sawing to filing can be made quickly since the saw guides and file attachments can be left in the machine. Tension in either saw or file chain is adjusted with a hand crank and an indicator is provided for the file chains and the various widths of saw blades.

The lower pulley is driven by a ½-hp. motor through a V-belt reduction providing five speeds from 60 to 375 ft. per min. to the bands. Base and column is of welded steel, but the table, measuring 24 x 25 in. is cast iron and tilts in two planes. A foot operated table feed is provided. On the side of the column there is mounted a Grob type BW butt welder for welding saw blades for internal cutting.

Air-Operated Tapping Machine

COMPRESSED air actuates the tapping head in both the drive and the reverse directions in a new universal tapping machine announced by the *Procunier Safety Chuck Co.*, 16-A South Clinton Street, Chicago. Movement of the tapping head is effected by a double acting air cylinder, but the success of air operation is largely due to the use of two adjustable compensating springs incased in a housing which is part of the connecting rod. The tapping pressure spring functions should the tap miss the hole, become jammed or the piston travel exceeds the tap travel on its own lead. The reversing pressure spring functions similarly should the tap jam on the way out.

The rate of feed for tapping in or backing out is controlled by two needle valves, which operate independently of the spindle stroke. Spindle travel is adjusted by trip arms. The machine has a capacity of from No. 2 tap to 5/16 in. in steel, ⅜ in. in cast iron or ½ in. in brass. Four spindle speeds are provided, from 390 to 2050 r.p.m. The unit includes a built-in coolant pump, air cleaner, air line lubricator, air pressure regulator and gage.

Machine Tool Spindle Roller Bearings

ABOUT five years ago, *SKF Industries, Inc.*, Philadelphia, began experimenting with roller bearings designed specifically for machine tool spindle application, using its own machine shops as a laboratory. The result of this development work has come to light in the form of a double row cylindrical roller bearing for which claims of superior performance are made. The chief features of this type of bearing are: small section height, enabling the use of spindles of large diameter and hence rigidity in limited space; tapered bore on inner race which is pressed on the spindle, eliminating creep; establishment of the internal fit of the bearing at the time of assembly by controlled expansion of the inner race, removing all play; cylindrical outer roller path, allowing the outer ring to be pressed into the housing, precluding deflections between ring and housing bore; use of a large number of rollers, with long roller contact and high load capacity; concentricity of the roller paths with the bore within extremely close limits; one piece solid bronze cage, with staggered rows of rollers; and the use of straight cylindrical rollers so that every point on the circumference has the same peripheral speed, eliminating internal sliding.

Deflections under heavy loads are reduced to extremely small amounts. Temperature rise under continuous loads likewise is held to very small amounts. The bearing is also said to resist wear and maintain the initial setting after long periods of service. These bearings are generally used in conjunction with flat plate ball thrust bearings. Designated as the N-4000K series they are supplied in SAE sizes from 02 to 96, ranging from about 1¼ to 27½ in. o.d.

Coolant Pump

THE *Ruthman Machinery Co.*, Cincinnati, has brought out a new Gusher coolant pump with a double suction intake and double pumping action that maintains a hydrostatically balanced thrust on the impeller shaft. The pump has no packing glands, foot, relief or by-pass valves, and throttling it merely results in an internal agitation and back pressure on the intakes. Because there are no metal-to-metal contacts, it can handle non-lubricating fluids and abrasive in suspension without injury.

This model No. 11023-E pump is arranged for flange mounting in a vertical position. It is equipped with a direct connected ½-hp. motor and will handle quantities up to 65 gal. per min., or 85 g.p.m. with a ¾-hp. driving motor. The impeller shaft is supported on two sealed ball bearings. The pump inlet opens directly into the reservoir and the discharge is through an outlet in the center of the inlet opening, making it possible to make connections internally and eliminating unsightly piping.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

International Business Machines Corp., 590 Madison Avenue, New York, adding and calculating machines, parts, etc., has let general contract to F. W. O'Connell, Water Street, Binghamton, N. Y., for one-story addition to main plant at Endicott. Cost close to $45,000 with equipment. J. W. Demarest is company engineer.

X-Ray Mfg. Corp. of America, Inc., 2 Stanton Street, New York, x-ray machines and parts, has leased space in building at 44 East Twenty-third Street for plant, expanding present facilities.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 18 for box connectors (Circular 73), quantity of switches (Circular 70); until Sept. 29, 18,851 reels (Circular 66).

American Brake Shoe & Foundry Co., 230 Park Avenue, New York, has asked bids on general contract for one-story addition, 137 x 180 ft., to branch plant at Birmingham, operated as Southern Wheel Division, for expansion in foundry, and two extensions, 45 x 90 ft. and 60 x 80 ft. respectively for charging room and cleaning department. Cost about $100,000 with equipment. J. V. Thomas is company engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 19 for saws, planers, jointers, shears, drill presses, saw filing and setting machines, grinders, belt sanders, drills, all motor-driven (Schedule 7070) for Brooklyn and Philadelphia Navy yards; 500, 700 or 900 aircraft suction regulating valves (Schedule 7075), electric tachometer generators in lots of 100, 200 and 400, and lots of 200, 300 and 400, and electric tachometer indicators in lots of 400, 600 and 800 (Schedule 7076) for Philadelphia Navy Yard.

Contracting Officer, Governors Island, New York, office of Post Quartermaster, asks bids until Sept. 25 for one flat bed printing press (Circular 429-20).

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Sept. 19 for gages (Circular 98), two two-spindle horizontal gun-drilling machines (Circular 79), calipers (Circular 106); until Sept. 22, one bed-planer type milling machine, 36 x 36 in., and 15 ft. long (Circular 83), drop forgings (Circular 102), portable belt conveyor (Circular 105).

United States Steel Barrel Co., Water and Mifflin Streets, Philadelphia, has organized Bayonne Steel Barrel Co., a subsidiary, Bayonne, N. J., to operate new branch plant at Constable Hook, Bayonne, comprising former steel barrel and drum-manufacturing works of Standard Oil Co. of New Jersey, recently purchased.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Sept. 18 for 94,000 screw hooks (Circular 278), 32,000 galvanized steel wire rings (Circular 277), 1074 lb. of music wire (Circular 307); until Sept. 22 for 5100 ignition cartridges for 60 mm. mortar ammunition (Circular 229); until Sept. 25, 40,000 hinges and 40,000 hasps for packing boxes (Circular 256), 400,000 adapters, consisting of small steel pieces, machined and plated (Circular 266).

Quartermaster Depot, Twenty-first and Johnston Streets, Philadelphia, asks bids until Sept. 21 for rigid steel conduit, galvanized steel outlet boxes, armored cable staples, solderless wire connectors, etc. (Circular 669-65).

C. Schmidt & Sons, Inc., 127 Edward Street, Philadelphia, brewer, has let general contract to A. Raymond Raff Co., 1635 West Thompson Street, for one-story addition for storage and distribution. Cost about $45,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Sept. 19 for 30 gages for 12-in. target practice projectiles (Circular 252), gages for fuse seat line, demolition bombs (Circular 251); until Sept. 20, one direct-reading hardness tester, lever type (Circular 256), gages for gage laboratory equipment (Circular 259); until Sept. 21, two motor-driven, precision-type toolroom lathes (Circular 261), two hydraulic shell-banding presses, 37-mm. shell (Circular 260).

BUFFALO DISTRICT

Electro Refractories & Alloys Corp., Andrews Building, Buffalo, has let general contract to Crea Construction Co., 111 Wallace Avenue, for one-story addition to plant at Lackawanna, N. Y., 50 x 100 ft. Cost close to $40,000 with equipment. Morrell B. Croop, 177 Rodney Avenue, Buffalo, is architect and engineer.

National Gypsum Co., 190 Delaware Avenue, Buffalo, building products, is concluding arrangements for bond issue of $5,000,000 of which $1,000,000 has been authorized for expansion and improvements in branch mill at East River and East 150th Street, Bronx, New York. Work has begun on three-story structure, 103 x 800 ft., with other units to follow.

NEW ENGLAND

Dorr Co., Inc., Danbury Road, Westport, Conn., machinery for chemical and mining plants, plans new one-story plant at Norwalk, Conn., 80 x 170 ft. Cost over $65,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 22 for one motor-driven horizontal boring, drilling and milling machine (Schedule 7101) for Boston Navy Yard.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Sept. 21 for steel forgings and seamless steel tubing (Circular 64).

Rising Paper Co., Housatonic, Mass., bond, ledger and other writing paper stocks, has asked bids on general contract for two-story mill addition, 35 x 200 ft. Cost close to $75,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Sept. 18 for 2468 automatic pistols, cal. 0.45, 84 sets of spare parts, and 4936 magazine assemblies (Circular 48); until Sept. 19, one horizontal, automatic milling and cutting-off machine (Circular 50).

WASHINGTON DIST.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Sept. 18 for 2000 lb. of flat nailless strapping and 4000 metal strapping seals (Circular 99); until Sept. 19, one pulley and belt (Circular 95); until Sept. 25, exhauster fan (Circular 100), indicating flowmeter (Circular 101); until Sept. 26, monorail scale (Circular 87); until Sept. 28, six furnaces, six ethylene generators, six coolers and scrubbers, two measuring tanks, one sulfur monochloride measuring tank (Circular 79), one oil burner unit, comprising six burners, two pumps, two blowers, two strainers, one air heater, one oil header, oil pressure gage, interlocking valve and accessories (Circular 84).

Fairfield Western Maryland Dairy Corp., 1125 Linden Avenue, Baltimore, plans new milk and milk by-products plant on 10-acre tract at Loch Raven Road and Baltimore & Ohio Railroad, comprising several one and multi-story units with power house, machine shop and other mechanical departments. Cost about $1,500,000 with equipment. Work is scheduled to begin this fall.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Sept. 20 for two motor-driven air compressors, with intercoolers and rheostats, for Philadelphia Navy Yard (Specifications 9411).

State Board of Mental Hygiene, 330 North Charles Street, Baltimore, Dr. George H. Preston, commissioner, plans expansion and improvements in power plant at Springfield State Hospital, Sykesville, Md., including additional equipment. Cost over $100,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 19 for one metal-working machine, metal-working lathe, tool-grinding machine, polishing and buffing lathe, grindstone, all motor-driven; one oxygen compressor, 100 steel oxygen cylinders, each 220 cu. ft. capacity (Schedule 3584); until Sept. 21, rubber insulated cable, and manhole frames and covers (Schedule 3592), brass or bronze unions, pipe flanges, pipe straps, brass or bronze pipe fittings, globe valves, check valves, angle valves and other equipment (Schedule 3585).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 19 for steel valves (Schedule 7117) for Eastern navy yards; until Sept. 22, two motor-driven tool-makers' precision lathes (Schedule 7093) for Carderock, Md.; two motor-driven internal grinders (Schedule 7095) for Alexandria, Va., yard.

SOUTH ATLANTIC

Marietta Coca-Cola Bottling Co., Marietta, Ga., plans new two-story mechanical-bottling plant, 60 x 90 ft., with facilities for storage, distribution and loading in rear. Cost close to $45,000 with equipment.

City Council, St. Cloud, Fla., plans installation of artificial gas plant. Equipment purchases will be made at once.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 19 for following tools for Charleston, S. C., yard: Nibbling machine (Schedule 7113), bolt-threading machine (Schedule 7114), ram-type turret lathe (Schedule 7116), turret lathe (Schedule 7119), milling machine (Schedule 7122), bolt-threading machine (Schedule 7120), draw-cut traveling head shaper (Schedule 7124), plate edge planing and scarifing machine (Schedule 7127), crank-type shaper (Schedule 7131), all motor-driven.

SOUTH CENTRAL

Colonial Bakery Co., 1340 Larkin Street, Memphis, Tenn., has asked bids on general contract for one-story machine shop, with service and garage building for company motor trucks adjoining. Cost over $40,000 with equipment. W. C. Jones, Sr. and Jr., Shrine Building, are architects.

Water Department, Natchez, Miss., will ask bids soon for diesel engine units and accessory equipment for municipal waterworks station. This is part of project for expansion and improvements in water system and facilities to cost over $200,000. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

United States Engineer Office, Memphis, Tenn., asks bids until Sept. 28 for one marine-type boiler (Circular 51-F).

Board of City Commissioners, Gulfport, Miss., asks bids until Oct. 15 for one-story addition to municipal warehouse on waterfront, consisting of five sections, each 160 x 220 ft., with three loading tracks. Cost about $300,000 with conveying and other mechanical-handling equipment. Shrouds & Bean, Gulfport, are architects and engineers.

SOUTHWEST

Midwest Piping & Supply Co., Inc., 1460 South Second Street, St. Louis, pipe coils, flanges and joints, fittings, etc., has let general contract to Austin Co., Arcade Building,

for one-story addition, 140 x 141 ft. Cost over $75,000 with equipment.

John Morrell & Co., foot of Quincy Street, Topeka, Kan., meat packers, will take bids before close of this month on general contract for six-story and basement addition, 100 x 150 ft., for expansion in lard refinery and other production divisions. Cost over $150,000 with equipment. Henschien, Everds & Crombie, 59 Van Buren Street, Chicago, are architects and engineers. Main offices are at Ottumwa, Iowa.

United States Engineer Office, Kansas City, Mo., asks bids until Oct. 2 for one 38,839-kva. and one 16,667-kva. electric generator units and auxiliary equipment (Circular 2).

C. Nelson Mfg. Co., 2304 Division Street, St. Louis, mechanical refrigeration equipment, has acquired plant at 4016 Union Boulevard and will improve for expansion.

City Council, Sterling, Kan., plans new municipal electric power plant to replace present station, with installation of diesel engine-generator units and accessories, pumping equipment, fuel oil tanks and auxiliary equipment. Cost about $198,000. Special election has been called Sept. 19 to vote bonds in that amount. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Evergreen Farms Co., Raymondville, Tex., W. A. Harding, head, recently organized, plans new dehydration plant comprising several one-story units. Cost about $50,000 with equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Sept. 25 for steel castings (Circular 4).

WESTERN PA. DIST.

Du Bois-Martin Aircraft Corp., Du Bois, Pa., R. H. Martin, head, recently organized, will asks bids on general contract this month for one-story plant for parts production and assembling. Cost close to $75,000 with equipment.

United Engineering & Foundry Co., First National Bank Building, Pittsburgh, plans expansion and improvements in branch plant at Youngstown, including one-story units for machine shops and other heavy machinery manufacture, and two-story office. Cost about $750,000 with equipment.

School District of Robinson Township, McKees Rocks, Pa., Gregg W. Cook, R.D. 1, secretary, asks bids until Sept. 19 for boiler unit and auxiliary equipment for power station at high school.

OHIO AND INDIANA

Rex Body & Fender Co., 1431 West Twenty-eighth Street, Cleveland, automobile bodies and sheet metal automotive products, has asked bids on general contract for one-story addition, 62 x 140 ft. Cost close to $50,000 with equipment.

Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, has asked bids on general contract for two-story addition to branch meat-packing and processing plant at 2210 Lockbourne Road, Columbus, Ohio, 60 x 175 ft. Cost over $50,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects, and A. M. Kinney, Inc., Carew Tower Building, is mechanical engineer, both Cincinnati.

Elyria Belting & Machinery Co., Williams Street, Elyria, Ohio, has plans for one-story storage and distributing plant, 50 x 125 ft., to replace a structure recently destroyed by fire. Cost close to $45,000 with equipment. Milo S. Holdstein, 241 Euclid Avenue, is architect.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, asks bids until Sept. 18 for one torque stand engine mount assembly, cowl assembly for forced-draft engine-cooling, dynamometer coupling assembly, dynamometer coupling hub (Circular 196), milling cutters, taper gages, reducing sockets, lathe indicators and reamer cutters (Circular 152), pneumatic riveting hammers, planishing irons, pneumatic riveters, pneu-hydraulic riveters, riveter cylinders, riveter sets, etc. (Circular 205); until Sept. 20, aluminum alloy, aluminum tape, aluminum welding rods, etc., 242 items in all (Circular 193); until Sept. 25, 21,000 lb. of iron welding rods and 34,950 lb. of steel welding rods (Circular 208).

Allison Engineering Co., Speedway City, Indianapolis, airplane engines and parts, will begin superstructure for one and two-story addition, 138 x 155 ft., for which general erection contract recently was let to William P. Jungclaus Co., 825 Massachusetts Avenue. It will be equipped for engine-testing and experimental building. Cost over $150,000 with equipment. J. Lloyd Allen, Architects' and Builders' Building, is architect. Company is a division of General Motors Corp.

MICHIGAN DISTRICT

Detroit Gasket & Mfg. Co., 12640 Burt Avenue, Detroit, has let general contract to William E. Beier, Marine City, Mich., for new one-story plant at latter place, where site recently was acquired. Cost over $50,000 with equipment. H. D. Ilgenfritz, 468 Prentis Street, Detroit, is architect.

Chelsea Spring Co., Chelsea, Mich., recently organized to manufacture steel springs, mechanical and wire forms, etc., has acquired one-story building, heretofore held by Sterling-Michigan Co., for plant. Structure is being remodeled for employment of about 150 persons.

Great Lakes Sugar Co., 7310 Woodward Avenue, Detroit, has approved plans for one-story addition to branch beet sugar mill at Fremont, Ohio, to be equipped as a potash evaporator unit to form a new by-products division. Cost close to $45,000 with equipment.

Hydro Mfg. Co., 825 Piquette Street, Detroit, mechanical equipment, has let general contract to Fullerton Construction Co., 11733 Russell Street, for new plant on East Outer Drive, comprising two one-story structures for general production and office building respectively. Cost over $55,000 with equipment. H. Augustus O'Dell, Marquette Building, is architect.

MIDDLE WEST

West Chicago Drop Forge Co., West Chicago, Francis Moore, head, organized to manufacture drop forgings and allied products, has let general contract to Harlow-Belding Construction Co., West Chicago, for one-story plant on West Grand Lake Boulevard. Cost about $45,000 with equipment.

Glidden Co., 5165 West Moffatt Street, Chicago, has let general contract to MacDonald Engineering Co., 1 North LaSalle Street, for new soya bean processing mill and elevator at 1800 North Laramie Avenue. Cost over $300,000 with equipment. Main offices are at Cleveland.

United States Engineer Office, Post Office Building, Chicago, asks bids until Sept. 25 for two one-story steel buildings at Government boatyard, foot of Hayward Street, Peoria, Ill., for a mechanical shop and pattern storage respectively (Circular 21).

Common Council, Brooklyn, Iowa, plans new municipal electric power plant, using diesel engine-generator units and accessories. Cost about $135,000 with equipment. Special election has been called Sept. 22 to approve bond issue in amount noted, and bids will be asked closely following.

Frank Turner, 804 Commercial Street, Waterloo, Iowa, has awarded general contract to Sheffield Engineering Co., 35 East Wacker Drive, Chicago, for two-story and basement mechanical-bottling plant, 130 x 130 ft. Cost close to $90,000 with equipment.

Stainless Stampings, Inc., Grafton, Wis., recently organized by Richard C. Bonner, Grafton, and associates, to manufacture steel stampings and kindred products, has awarded structural steel contract to Worden-Allen Co., Milwaukee, for new one-story plant, 60 x 140 ft. Cost about $45,000 with equipment.

Swift Lumber & Fuel Co., Lincoln, Neb., plans new bulk oil storage and distributing plant near Twenty-seventh Street and line of Rock Island Railroad, comprising several units, with steel tanks, pumping station and other facilities. Cost over $65,000 with equipment.

Paul Schulze Baking Co., 25 North Green Street, Chicago, will ask bids soon on general contract for one-story and basement baking plant on Racine Avenue. Cost over $150,000 with traveling ovens, mixers, loaders and other equipment. Engineering Systems, Inc., 221 North LaSalle Street, is architect and engineer.

Electric Co., Milwaukee, plans for a $4,137,000 steam and electric generating unit at its Commerce Street plant have been approved by Wisconsin Public Service Commission. Program calls for installation of a 35,000-kw. turbo-generator and boiler, with rated steam output of 375,000 lb. an hr. Boiler will be housed in a new 79 x 134 ft. structure, 110 ft. high. Company will design and direct construction of equipment.

PACIFIC COAST

Bureau of Reclamation, Denver, asks bids until Sept. 20 for two welded steel tanks for storage of transformer oil, and two similar tanks for storage of governor and lubricating oils at Grand Coulee power plant, Grand Coulee, Wash. (Specifications 1283-D).

Safeway Stores, Inc., 1925 East Vernon Avenue, Vernon, Los Angeles, has plans for new one-story meat storage and distributing plant at Vernon, totaling about 85,000 sq. ft. of floor space. Cost over $125,000 with equipment, including mechanical-handling appliances. Edwin F. Rudolph, 132 West First Street, Los Angeles, is engineer.

Northrop Aircraft, Inc., 126th and Acacia Streets, Hawthorne, Cal., airplanes and parts, has awarded structural steel contract to Bethlehem Steel Co., Los Angeles, for new one-story plant near 120th Street and Crenshaw Boulevard. Initial units will total about 100,000 sq. ft. of floor space for parts production and assembling. Cost over $175,000 with equipment. B. G. Reed is company engineer.

Purchasing Officer, Department of Interior, Washington, asks bids until Sept. 19 for one high-pressure pumping unit with accessories (Circular 5377), one 5-kw. gasoline engine-driven generator unit and auxiliary equipment (Circular 5376), and quantity of two-conductor, standard-stranded cable (Circular 5378), all for Flagstaff, Ariz.

Water Department, Bellingham, Wash., plans early purchase of an air compressor, authorized by city council. George Brock, water superintendent, is in charge.

Jensen Motorboat Co., 1414 East Northlake Avenue, Seattle, has approved plans for one-story addition, 54 x 212 ft. S. Ivarsson, Skinner Building, is engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 22 for eight marine diesel engines and accessories, main propelling type (Schedule 7068) for Mare Island Navy Yard; until Sept. 29, eight motor-generator sets and spare parts (Schedule 7094) for Puget Sound yard.

Administrator, Bonneville Project, Department of Interior, Portland, asks bids until Sept. 23 for steel towers and appurtenances for Kelso-Chehalis and Chehalis-Renton power lines of Bonneville transmission system (Circular 532).

FOREIGN

Australian Aluminum Co., Pty., Ltd., Sydney, New South Wales, Australia, recently organized as a joint interest of British Aluminum Co., Ltd., London, England, and Aluminus, Ltd., Montreal, has approved plans for new plant for production of aluminum alloys at Granville, near Sydney, comprising several one-story units, with power house and other mechanical departments. Cost close to $1,500,000 with machinery. N. Warren Waterhouse is general manager.

Masonite Corp. of Canada, Ltd., Gatineau, Que., recently formed as an interest of Masonite Corp., Laurel, Miss., manufacturer of insulating fiberboard products, has let general contract to Burnet & Sons, Ltd., 202 Cathcart Street, Ottawa, Ont., for one-story mill at Gatineau, 150 x 335 ft. Cost over $125,000 with equipment. S. L. deCarteret, vice-president of Canadian International Paper Co., Montreal, with mill at Gatineau, is president of new company.

War and Machine Tools

(CONTINUED FROM PAGE 52F)

machines were advancing into January at the end of last week. Certain sizes of shapers, small size lathes and some surface grinders were still available fairly quickly. A few special machines, including one type of large lathe favored by arsenals, were reported virtually impossible to obtain within any reasonable length of time at the start of this week. As in many other industries, stocks of new machine tools in dealers' hands were none too large. Uncertain conditions prevailing since 1937 were of course responsible for this situation.

Price advances ranging around 12½ per cent were announced within a few days after the rush began, although some equipment manufacturers began putting their prices on the basis of 15 or 20 days.

Cincinnati machine tool plants are gearing up their present production rates in anticipation of the unusual heavy demand anticipated, but, should this spurt reach the tremendous proportions of the last war, plants there will be more than overtaxed to meet deliveries. The labor problem is beginning to be one of importance, since there is a shortage of good, skilled mechanics, and of course any increase in production will make this situation become acute. Manufacturers are also questioning whether the foundry capacity is sufficient to take care of a sharply increased demand, but as yet this has not become a great problem. As to individual types of machines, milling machines and grinders are most active and plants manufacturing these types are running practically at capacity. Lathes, drills, shapers and brakes are still in good demand, but there is a margin of production still available. The heavy types of tools are still least active, but a flood of inquiries for these types indicate an early rise in demand for planers, boring mills and similar machines.

The cancellation of the Cleveland show was in conformity with the present anticipation of unusually heavy business, manufacturers generally feeling that within the next 30 days order books will become so filled that the show would cause a loss to the industry in diverting men, time and attention needed in actual production. Several minor factors also entered into the decision, according to local manufacturers, such as the fact that a large group of French and English engineers, who had expected to be present at the show, are now unable to attend and therefore this potential market would not receive its full attention.

Demand for Used Machinery

With the intensified demand for new machine tools, used equipment markets also became much more active. Inquiries last week seemed to center particularly on used milling machines, being sought by dealers from Canada to Texas. Milling machines have been in good demand all year, especially by buyers for European countries. There is very little quibbling over prices at the present time.

Canada Experiences Buying Rush For Steel and Pig Iron

TORONTO, Sept. 12 — Heavy buying for spot and future delivery poured into the Canadian iron and steel markets immediately following declaration of war in Europe. During the past week steel interests were flooded with orders. Consumers apparently are endeavoring to close contracts ahead of a possible price advance. Sheets, bars and practically all materials swept into the active list and while producers are accepting business as offered, they are not closing long term commitments. Buyers are awaiting developments with regard to prices but so far nothing has happened. Announcement from the Dominion Government that steps will be taken to see there is no profiteering seems to have retarded any swift upward price movement, but it is believed there will soon be steps toward an orderly upturn. As the matter now stands local representatives of steel companies have adopted a watchful waiting attitude and in dealing with prices state that quotations only are for the day and they do not know what may develop tomorrow.

Sheet sales have increased considerably, with producers booked almost to the end of the year and running about 10 weeks behind in deliveries. It is stated that contracts beyond the end of the year are being refused. Bars also are in heavy demand and, while orders are being taken, it is reported that producers in most cases are sold out for the last quarter. Other materials have come into correspondingly brisk demand. Much of the business booked recently has been for peacetime activities, and big war contracts so far have had little to do with demand for iron and steel. This will come later.

It is reported that a British board has arrived in Canada to undertake the award of contracts for munitions, armaments, shells, etc. Plants equipped to handle this type of business are assured large orders. Inquiries also have appeared from British interests regarding capacity of Canadian airplane producing plants, and large contracts for bombers and other flying machines are expected to be closed immediately in addition to those awarded at the beginning of the year. The Canadian Government has announced that it will place its entire resources behind the British Government in the production of war supplies of all kinds.

Merchant pig iron bounded into activity during the week and there was a rush on the part of melters to cover for fourth quarter. It is stated that most of the large melters have covered to the end of the year and inquiries continue to pour in. Spot buying also has shown more activity and sales for the week made a new record for the year. Local blast furnace representatives state they have no indication regarding price changes, but the majority are of the opinion advances are in the offing. Contracts however, are being accepted at current prices to the end of the year, but no booking is being accepted beyond that period.

Rail Income at 1.66% Rate

CLASS I railroads of the United States in the first seven months of 1939 had a net railway operating income of $214,762,841 which was at the annual rate of return of 1.66 per cent on their property investment, according to reports just filed by the carriers with the Bureau of Railway Economics of the Association of American Railroads.

JUST BETWEEN US TWO

Forecast

". . . there should be no delusion as to the value of war as a bearer of real prosperity . . . The havoc a general European war would work is incalculable . . . One country, like the United States, might profit for a long time from the distress of others, but in the long run the heavy burdens under which the warring nations would stagger when peace had come would be handicaps which no part of the world could wholly escape."

—From an editorial in The Iron Age of July 30, 1914

Straight From the Feedbox

Our most persistent contributor is "S.W." of Chicago, who believes the song, *"Heaven Can Wait, This Is Paradise,"* was dedicated to the U.S.S.R. Every Friday or so he sends us a pencilled philippic cataloging the bourgeois lapses in the week's issue of your favorite family journal.

As every one of the 18 readers of this column is precious to us, we would like to write "S.W." a there-there-now letter, but we don't know who he is, so we will have to thank him here for giving us this peek at destiny's timetable:

"Business will be good in this country for six to eighteen months—and we will enter the war within that period—to keep it good.

"If the fight between Germany and England and France lasts more than six months, it will not last much more than two years, and will terminate due to internal conditions, rather than military force."

Plugged Ears Will Help

The first part of "S.W.'s" forecasts check up with what Leon Wesley Moffett (*"This Week in Washington"*) said last week—that "a large section of the country" believes we'll be in the war "provided a majority conflict develops in Europe and lasts six months or more."

The general feeling, our Washington editor adds, is that a disregard of propaganda will improve our chances of remaining neutral. So far, the propaganda mills have barely begun to grind and up to this writing the major warring powers have been unnaturally polite to each other. The chances are that even in Hitler's letter to Daladier the arrangement of the adjectives italicized below was unfortunate rather than deliberate:

"Germany holds no ill-feelings, much less hatred, for its *one-time brave* opponent (France)."

Linotyper Errs Brilliantly

Of course, there are those who hold that there is no such thing as an error—that what seems to be a slip is merely the subconscious breaking through. As, for instance, this from the New York World-Telegram:

"Associates of Hitler said his face is always serious these days, but that his entire attitude is one of claim."

Stopper

"Alleys of Black Hell" Where Only the Fittest Survive!—*Allis-Chalmers.*

Father!

It is a constant source of chagrin to us that, although we refer to our readers sentimentally as members of the "family," few respond in kind. We try to convince ourselves that only their chilly Nordic temperament prevents them from showing the depth of their affection. However, at times it does become a bit trying, which is why we are so grateful to the sympathetic Japanese steel tubing manufacturer who writes:

"As one of your relatives we congratulate THE IRON AGE . . . "

Puzzle-Hater

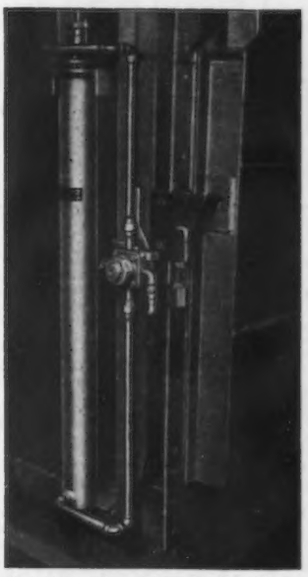
W. H. Brooks of the Carnation Co. (*"From Contented Cows"*) writes that he is one-eighteenth of our public and that he craves the original of "The Bull of the Woods" Aug. 31st cartoon—the one about the erring, mortified draftsman. We would like to oblige but understand Williams' originals have become collectors' items.

W.H.B. says he abhors puzzles. We can't figure them out either, and after spending two hours on a headache like this our will power always asserts itself and we turn to something useful:

When I was born, my sister was one-fourth as old as my mother. She is now one-third as old as my father, and my own age is one-fourth of my mothers. In four years I shall be one-fourth as old as my father. How old am I, my parents and my sister?

—A.H.D.

Another job done better with Curtis Air Cylinders



Operating oven-door at Buffalo Plant

Curtiss-Wright Corporation uses Curtis Air Cylinders at Buffalo and St. Louis Plants

The simplicity and dependability of Curtis Air Cylinders make them ideal for many lift, push or pull operations (as in this Curtiss-Wright installation), since interruption of production schedules to make repairs must be minimized. Under such conditions, Curtis Air Cylinders give unfailing service because of their rugged construction and simple design (only one moving part).

The installation cost of Curtis Air Cylinders or Hoists is small, and power consumption low, using regular shop air lines. Accurate control is assured, and there is no risk of injury from overload or bad atmospheric conditions. Because of their efficiency, negligible maintenance expense and long life, important savings are almost inevitable wherever they can be used.

Check your plant to see where Curtis Air Power Cylinders can be applied to increase efficiency. Our new 28-page booklet, "How Air is Being Used in Your Industry" will give you helpful suggestions. Just send in the coupon—no obligation.

CURTIS Compressors • Air & Hydraulic Cylinders Air Hoists • I-Beam Cranes & Trolleys

CURTIS PNEUMATIC MACHINERY COMPANY
1948 Kienlen Avenue, St. Louis, Missouri
Gentlemen: Please send me the new 28-page booklet, "How Air is Being Used in Your Industry."

Name_____ Street_____

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City_____

PRODUCTS INDEX

WHO MAKES IT

Here you find a weekly listing of hundreds of products with the names and addresses of manufacturers. The advertisements of these companies appear in The Iron Age.

ABRASIVE CLOTH & PAPER
Norton Co., Worcester, Mass.

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVES—Steel Shot and Grit
American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
Harrison Abrasive Corp., Manchester, N. H.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh (Pa.) Crushed Steel Co.
Steel Shot & Grit Co., Boston, Mass.

ACCESSORIES—Welding
Lincoln Electric Co., The, Cleveland.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders & Small Tanks
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

ACID-PROOF CEMENT
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

AIR CONDITIONING EQUIPMENT
American Blower Corp., 6000 Russell St., Detroit.

ALLOYS—Copper
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

ALLOYS—Ferro
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS—Tungsten
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM
Aluminum Co. of America, Pittsburgh.

AMMETERS & VOLTMETERS
General Electric Co., Schenectady, N. Y.

AMMETERS AND VOLTMETERS—Recording
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

AMMONIA RECOVERY PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES
Lebanon (Pa.) Steel Foundry.
United Engineering & Fdry. Co., Ptgh.

ANODES—Lead
National Lead Co., 111 Bdway., N. Y. C.

APPAREL—Welding
Lincoln Electric Co., The, Cleveland.

ARBORS
Cincinnati (Ohio) Milling Mch. Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose
Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.

ASBESTOS
Carey, Philip, Co., The, Cincinnati, Ohio.
Johns-Manville Corp., 22 East 40th St., N. Y. C.

ASSEMBLIES
National Sewing Machine Co., Belvidere, Ill.

AXLES—Car or Locomotive
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BABBITT METALS
Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadman, A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Co., Philadelphia.
Gardiner Metal Co., 4884 S. Campbell Ave., Chicago.
National Lead Co., 111 Bdway., N. Y. C.

BALANCING EQUIPMENT
Sundstrand Machine Tool Co., Rockford, Ill.

BALANCING MACHINES — Static Dynamic
Gisholt Machine Co., Madison, Wis.

BALING PRESSES—Scrap — See Presses—Baling

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.
New Departure Div., General Motors Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

BARRELS—Tumbling
Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn.) Steel Ball Co., The.
Whiting Corp., Harvey, Ill.

BARS—Alloy
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BARS—Aluminum
Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper
Bunting Brass & Bronze Co., Toledo, Ohio.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS—Cold Drawn
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
Bliss & Laughlin, Inc., Harvey, Ill.; Buffalo, N. Y.
Jones & Laughlin Steel Corp., Pittsburgh.
Monarch Steel Co., Indianapolis, Ind.
Union Drawn Steel Div. Republic Steel Corp., Massillon, Ohio.

BARS—Concrete, Reinforcing
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.
Nicetown Plate Washer Co., Inc., Philadelphia.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS—Rustless
Midvale Co., The, Nicetown, Phila., Pa.
Rustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Ecorse, Detroit
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
LaSalle Steel Co., Chicago.
Monarch Steel Co., Indianapolis, Ind.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage
Electric Storage Battery Co., The, Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadman, A. W., Mfg. Co., Pittsburgh.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Ball
Bantam Bearings Corp., The, South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wisc.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover, Ohio.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Ind.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Ind.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div. General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp. Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Ind.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Ind.
Hyatt Bearings Div. General Motors Corp., Newark, N. J.
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Ind.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Ind.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Shaft Hanger
Hyatt Bearings Div. General Motors Corp., Newark, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BEARINGS—Thrust
Bantam Bearings Corp., The, South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div. General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Timken Roller Bearing Co., The, Canton, O.

BELT—Conveyor, Elevator
Goodrich, B. F., Co., The, Akron, Ohio.
Hewitt Rubber Corp., Buffalo, N. Y.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BELTING—Metal, Conveyor, High and Low Temperature
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Hewitt Rubber Corp., Buffalo, N. Y.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Goodrich, B. F., Co., The, Akron, Ohio.

BENCH LEGS—Steel
New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Buffalo (N. Y.) Forge Co., 492 Broadway.
Cincinnati (Ohio) Shaper Co., The.
Cleveland (Ohio) Punch & Shear Works Co., The.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

BILLETS—Alloy
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.

BILLETS—Alloy Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon
Harrisburg (Pa.) Steel Corp.

BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Harrisburg (Pa.) Steel Corp.
Jones & Laughlin Steel Corp., Pittsburgh.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel
Cleveland (Ohio) Punch & Shear Works Co., The.
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.